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FOOD RESEARCH INSTITUTE STUDIES

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AGRICULTURAL PRODUCTIVITY, ECONOMIC GROWTH, AND THE FARM POLICY MOTIVATION OF URBAN ELECTORATES

Whatever the stage of their economic development, all nations continue to have, as always, a vital concern in agriculture and food. In the last few decades farmers in some of the highly industrialized countries have succeeded in utilizing the results of scientific research, innovation, and mechanical engineering on such scale that productivity has increased more than in the nonagricultural parts of the economy. The problem in leading agricultural exporting countries, including the United States, Canada, Argentina, Australia, New Zealand, Burma, and Thailand, is a continual aggregate excess capacity of food and fiber production, while in enormous areas of the world with an overwhelming majority of the world's population, agriculture is struggling hard to produce at least a minimum supply, for the direst needs, of food, feed, and fibers.

It may seem paradoxical that in the industrially advanced countries with excess agricultural capacity, either in the aggregate or for certain major commodities, the farm policy typically involves heavy subsidization of farm income and farm exports, while in the forcefully and coercively industrializing countries with their notorious shortage of farm products the opposite is true; namely, the state subsidizes industries at the expense of the farmers by a variety of measures which squeeze capital out of agriculture. However, in reality, state intervention in the form of income support as well as the "squeeze" is to a considerable degree responsible for excessive or insufficient output by overaccelerating or by retarding growth of capacity.

In the United States as well as many Western European countries there has evolved through many years a political and legislative deadlock in the treatment of their peculiar type of "farm problem." It seems essential for all countries with representative government that their electorate, legislators, and administrators understand fully the nature of the impact of technological change and the powerful dynamic shifts and changes in the structure and performance of agriculture within a private enterprise and market economy. This is particularly necessary because in all these countries the farmers, like industrial groups and a part of labor, for at least two generations have been politically well organized and very

effectively represented, something that does not hold for the consumers. Moreover, the actual situation in agriculture in industrially advanced countries is substantially different from what the public thinks it is and what certain farm pressure groups claim it to be. Only when it is clearly seen what specifically has caused the continual rise in productivity of agriculture will it be possible to break the deadlock of farm policy without impeding the forces that give agriculture in the noncoercive society its momentum in the creation of wealth while protecting an abundant, reasonably priced supply of what remains every industrial nation's foremost raw material—food.

In all countries, the hard core of the over-all farm problem is not cyclical or temporary, but almost eternal in nature and therefore not amenable to a real remedy or cure. It is part of the epic of man's struggle for survival in, and gradual conquest and partial control of, a hostile, reluctantly and scantily yielding nature. The core of the farm problem is an integral element in the eternal process of economic development and growth. What has happened in agriculture's history and what continues to go on differs considerably from what is popularly assumed in many countries, including the United States, to be a temporary disturbance in a more or less static situation in man's adaptation to geography and nature.

CONTINUAL SHIFT IN ALLOCATION OF HUMAN RESOURCES

In Thomas Jefferson's time nine-tenths of the American people earned their living by farming. Around 1900, only 50 per cent of the labor force worked on the farm; today it is less than 10 per cent. This evidence of profound social and economic change is most significant and illuminating.

What was the state of the American economy 185 years ago? This can be shown by the economy of many pre-industrial countries which today are still where our economy was then. In the underdeveloped economy nearly all economic activities are carried on at the farm except for work done by government personnel, armed forces, teachers, and some general storekeepers and other merchants. Food, clothing, shelter, farm and other tools, transportation, education, entertainment, and medication are all produced on the farm. Farmers build houses, barns, and bins out of brick, wood, and other materials; they lay pavements, dig ditches and canals, build bridges and dams; they raise draft animals, tan hides, and card, spin, and weave; they process and cure any sort of food, and bake bread; they slaughter, preserve, smoke, salt, and pickle; they produce wheels and wagons and sleds, and with animal draft power provide transportation for people or cargoes. Farmers provide entertainment at all festivals, baptisms, nuptials, and after funerals; they educate and train the young people, treat the sick and the aging, and bury the dead. So farmers are jacks-of-all-trades, producing plants and animals, lumber and firewood, and peat and gravel and sand. Naturally, what goes to market for cash is little. Hence, it is sheer nonsense to measure their real income by the cash returns in dollars, as is done today by international agencies in their statistics for underdeveloped countries, and to use such meaningless and utterly misleading figures for comparisons with countries that have a highly developed exchange economy. This distorts the true income out of all proportion, exaggerates almost to futility the task of develop-

ment, and serves only to stir resentment against the industrially more advanced nations. Since the criterion for an underdeveloped economy is the predominance of what the Greeks called the "oikos," i.e., the self-supporting household, and the absence of a high volume and velocity of exchange of goods and services, the degree of abject poverty of entire nations is statistically created by definition.

In that underdeveloped stage the economy functions within a structure of total decentralization and with vast numbers of small, vertically integrated units. As development begins, one activity after another is segregated from many farms at a time. Hence, not only do new occupations arise, but the skilled workers begin to operate on a much larger scale than before, at much lower costs and prices, and with much higher profits. Since they no longer produce for themselves but for customers, the market begins to become more active. Many specialized crafts appear: wheelwrights, carriage and harness makers, blacksmiths, and more and more of all the others. Their lower prices expand the market, and their income increases the demand for farm products. If originally farmers were jacks-of-all-trades, they gradually became jacks-of-fewer-and-fewer-trades and thereby became more skilled and more productive. Thus, by the division of labor, farm operations become more and more specialized and refined—until ultimately only crops and animals are produced. This process lowers costs per unit of product and leads to lower prices of farm products or higher farm profits or both, a shift that generates more development. Gone from the farms are the building trades, the processing of textiles and clothes, the slaughter and curing of meat; finally even bread, butter, and most other foods are bought because the time of the farm people is so precious.

This process of economic development is little understood. It amounts to a piecemeal disassembling and reassembling of the economy with growth of cities and the rise of industries, commerce, transportation, education, research, and a multitude of more and more refined services.

As more people become urban consumers with a rising purchasing power, they are bidding not for more calories but for a diet with more calories from products with a high "value added," such as sugar, milk, meat, bacon, butter, eggs, fruits, and vegetables, and less from starchy staples like corn, wheat, and potatoes. With a rising demand for their products in the markets the people remaining on the farm increase their output, and with it their income. In order to do this, they have to equip themselves with better tools, more mechanical power, better plants and animals. In other words, they must increase the capital at their command, and must perform with ever increasing efficiency as self-employed farm manager-workers. In doing this they continue to lower the unit costs and the prices of their products while increasing their income.

VOLUNTARY MOBILITY OF LABOR

All of this is proceeding every day in our completely decentralized, essentially free-enterprise economy where people are not pushed from one job to another by the Government or anybody else, but where under the lure of differential inducements by employers they make their own choice and choose their occupation, their place of work and living, according to their own preference and the available opportunities. In doing this the families evaluate the whole package of working

and living conditions, the opportunity of improving their composite income in cash, kind, and amenities, the security of their job and livelihood. Even in the backwoods they usually know very well what other jobs pay, and they decide to take or leave the often better pay.

He who claims that in recent years several million farm people "have been driven off the farm" should first explain who was responsible for the shift from 90 per cent to 10 per cent in farm work in 185 years. Who drove them off? The answer is: Nobody, except perhaps occasionally a nagging partner in marriage. Those who left did the sensible thing, contributing their service where it was needed most as the country developed and the economy started and continued to grow. In a politico-economic system of free people nobody has a right to determine where the individuals and families live and where they choose to work, or on what, except they themselves. In fact, so long as they ask for no support from the public, pay their taxes, and are not delinquent as parents of minor children, nobody has a right to force them to be efficient or to increase their income, even if they prefer to live like hermits or to sleep like Rip van Winkle. In reality, since all normal people have a great variety of needs and a far greater variety of wants, it is safe to count on their desire to satisfy these needs and wants and to respond to the incentives for doing so which the market economy with flexible wages offers.

It is axiomatic that without the movement of people from farm to town and cities, all industrial and urban development—the entire construction of a civilization on a continent that 100 years ago was still mostly wilderness—would have been impossible.

THE PARADISE-LOST COMPLEX OF URBAN ELECTORATES

Moreover, in this long historical shift from farms to urban life and work lies the key to a secret in all modern democracies which puzzles even political scientists and which few people understand: namely, the fact that the smaller the proportion of farm people in the electorate, the more they are assured of the good will of urban voters, legislators, and administrators, and their readiness to grant farm aid. It is not the rising political power of rapidly shrinking "farm blocs" that guarantees this, but the subconscious memory of all people in Western industrial society that all of them originally came from the farm, which solidly anchors their fondness and affection for the farm people. I call this the urban dweller's image of Paradise Lost: the farm as the forebears' origin and the happy valley where life is imagined as having been simple, safe, harmonious, and peaceful. Indeed, it is an incontestable historical fact that, outside of the Garden of Eden, the cradle of all civilizations was the farm. Mixed with such nostalgia is a feeling of guilt toward those who were left behind in the heroic march of urban progress and who are supposed to be condemned to live in social isolation, deprived of the comforts of modern city residences, forced to do hard physical work for long hours, being tied to tend cows and other animals 365 days a year, exposed to the vicissitudes and hazards of weather and unstable international markets. All such secular assumptions have a strong foundation in the high social value that most religious bodies assign to the farm as a favorable setting for family life. Hence, with this reverence for their idealized common origin, the

urban voters have nothing against subsidies for the "poor fellows on the farm," even if it means many billions of dollars of taxpayers' money. All they care about is that the money not be wasted by bureaucrats and shall really help the farmer, which is after all reasonable enough. What really motivates the free society and its noncoercive economy is the social conscience and a striving for justice and equality.

Irrespective of how far these thoughts stray from reality, they are anchored deep in the modern industrial nation's soul and backed by the determination of the electorate in a democracy to come to the assistance of the underdog. Such thoughts are as solid and real a stock of good will for the farmer as is the stock of gold bullion in Kentucky for the United States Treasury. Indeed, they should be nursed by the farmers, their organizations, and their political leaders as tenderly as the gold reserve is by the Secretary of the Treasury, the disproportionately large representation of farm interests in the United States Senate notwithstanding.

What has actually happened on the farms is far more complex than the average citizen can realize, and the present farm situation is quite different from what such nostalgic sentiments imply. Needless to say, the dim past was also quite different from what its idealization makes of it.

Our economy has grown in the long run at a very steady rate and this growth has at all times been hinged to the rise in agricultural productivity, meaning the rate of output per man-hour. In recent years the rate of productivity on farms has not only left the rates of growth of population and per capita income far behind, but also the rate of productivity of the rest of the economy. This gain has historically been the effect of increased productivity elsewhere, and in a shuttlecock reaction has become the cause of more productivity in agriculture, which again caused productivity gains elsewhere. How this has technically come about may be sketched in a few rough strokes as follows.

MECHANIZATION OF A GREAT TRANSPORT INDUSTRY: AGRICULTURE

Agriculture is in fact the world's oldest and, until recently, its greatest industry of year-round cross-country transportation. In the United States nowadays our 3.7 million farms use and operate 470 million acres of cropland, 900 million acres of grazing land, and over 160 million acres of commercial forest land, or a total of more than 1.5 billion acres, from below sea level to high mountain plateaus. Every square foot of cropland must be worked with implements and tools, or passed over with loads of materials many times every year—indeed, for some crops up to 35 times—and, where double or triple cropping takes place, even more often. And people and bulky commodities have to be transported from the fields to the farmstead and back again, and from town to farm and from farm to town.

Therefore, to a large extent the saga of progress on the farm is the saga of the fabulous evolution in the technology and reduction of costs of transportation which began with better ocean-going vessels to and from the New World. The American Indians had no ox, no donkey, no horse, and not even a cart with wheels. The Spaniards and other colonial powers to whom we owe our origin brought cattle, donkeys, mules, horses, and wagons. This increase in transport

power and rolling stock was the most decisive capital import that gave the spur to development. From their beginning up to the turn of this century, American farmers, with the employment ultimately of over 30 million draft animals, converted some 450 million acres of cropland and some 700 million acres of grassland to agricultural use, and cleared in the process some 400 million acres of forest land in humid climates. This basic operation of pushing the forests back to the "absolute" forest land cost three generations of toil; it was a piece of home work Western Europe had already done during the Middle Ages, and something Soviet Russia must do in the future. Contrary to the ignorant indictment by politicians in the early thirties, this clearing of the woodland was one of the great achievements on which, here as in Europe, the civilization was built. Clearing the wood not only freed moist acreage for crops such as cotton, tobacco, wheat, oats, corn, and root crops, and opened land for pasture and hay; it supplied the entire economy with fuel for homes, industries, steamships, and railroad engines, and also the chief raw material for housing and most other construction, including railroad ties and mine timbers. As Schurr and Netschert have shown, in 1850 fuel wood supplied over 90 per cent of all heat and mechanical energy consumed in the United States, while by 1900 the fuel wood share had declined to 21 per cent and by 1955 to less than 3 per cent.

The first impetus to growth was passed to American farming by water transportation, which is still today far less costly than any form of land transport. Yet draft animals powered all land transport on which agriculture and industries relied. Around the middle of the last century steamships and railroads began to supplement and gradually to replace draft animal transportation between farms and markets. This reduced costs enough to move tallow and hides and grain over longer and longer land distances, and set free more and more draft animals for work on the farms.

As the economy developed, draft animals became clearly too inefficient in terms of both manpower and cropland. Labor, especially, was too scarce and expensive to be wasted. Toward the eighties of the last century the steam engine brought the huge steam plows such as those built by Fowler in Leeds. I still operated these on German estates in 1919, and there are still some standing around on western ranches in the United States. But these twin monsters with their steel cable with which they shuttled the 12-share tilting gangplow back and forth across the field, made no real inroads on animal draft power. They were too clumsy, too costly, and could be used only for plowing. Neither did the electric plow bring any change despite Lenin's prediction in 1902 while in exile in Switzerland. (A German corporation and a Soviet Russian Institute experimented with the electric cable plows until the mid-thirties.)

But in this century the internal combustion engine became, during and after World War I, the effective replacement to animal power—though first, and still predominantly, in this country. It provided individual motive power for the totally decentralized transportation industry that is identical with agriculture. Progress was slow and halting. But the potential market of 100 million farms in the world attracted and concentrated the work of the engineers of many countries on the task. However, the horse could be profitably replaced only with the combination of three motor vehicles—the tractor, the truck, and the car—because the horse, with the equivalent of four or more gears giving it different speeds

and gaits, was effective locomotive power for wagons, carts, and buggies as well as for farm machines. But with the introduction of power take-off, self-propelled machines like combines, and the all-purpose tractor with adjustable axle width, attachable tools, and powerlift, all formerly horse-drawn equipment was gradually replaced. However, this scrapping of all the obsolete inventory and the replacement of all "rolling stock" of wagons and implements involved a vast amount of new capital, and tied agriculture more and more to the commercial operations of the exchange economy and its cycles.

The revolution in transportation on and off the farm which the internal combustion engine has brought about since 1914 has continually lowered one of agriculture's greatest operational cost items per unit of product and thereby contributed remarkably to economic growth.

Today we have a fleet of 15 million tractors, trucks, cars, and combines, plus many million electric motors, on less than 4 million farms. At the peak of animal draft power use in the late 1920's about 15 million horsepower were available. A recent estimate listed the mechanical power equipment of our farms at 115.6 million horsepower, all railroads at 88.7, and all factories at 28.2 million. The result is a gigantic increase in all transportation *on the farm* while transportation *off the farm* has mostly been taken over by others: barges, railroads, trucks, and air cargo carriers. The increase in available means of transportation on the farm has been further improved by the shift in the entire economy from the farm-produced and transported cordwood as fuel to minerals like coal, oil, and gas, or to hydroelectric power.

Furthermore, agriculture ceased to transport the small grains—with about twice as much weight of straw—from field to bins for threshing during the winter, and to transport the vast amount of straw back to the fields once it had been used as litter in barns. The combine harvester-thresher eliminated movement of all the straw. The disappearance of this huge transportation job on the farms promptly set free a vast amount of draft power and labor for more effective cultural practices.

With oxen, horses, and mules practically gone, and with vastly more mechanical draft power at hand, there is more speed, more power-propelled equipment, and such a gain in productivity of manpower on farms, that despite increasing purchasing power of a rapidly growing population there is a surplus of manpower on the farms. It seems likely that for the next decade this surplus will continue, while better equipping of manpower with mechanical draft power will remain profitable. Thus, agriculture is still a growing market for the farm machinery and vehicle industries, and the petrochemical industries. Our farms are consuming half as much steel as the entire automotive industry. Secretary of Agriculture Ezra Benson, in a speech on November 21, 1958, at Beltsville, estimated that by 1975 United States agriculture would purchase chemicals at an annual rate of $3¼ billion—namely $1 billion worth of pesticides and $2¼ billion worth of fertilizers.

FAVORABLE PRICE-COST RATIOS

The value of the equipment of our farms, including machinery and motor vehicles, has increased in the last 20 years from $3 billion to over $18 billion current dollars, or, valued in constant dollars at 1940 prices, from $3 billion to

over $7 billion, i.e., by 138 per cent. But in terms of work capacity and actual performance, the gain represented by this increase per volume and quality of physical productive assets is immeasurably greater. Of course, farmers buy more new machinery, not because they love new gadgets that do more fancy stunts, but only if and when all costs per unit of work leave a clear net gain over the costs replaced, and in the course of several years the costs per unit leave a net gain under the prevailing sales price per unit on the farm. Since for many years farm wages have been rising much faster than prices of labor-saving machinery, and the costs per unit of machine work have been rising much less than prices of farm products, farmers have invested in more machinery. And since the growth of the general economy has absorbed the labor set free, the number of farms has shrunk from a peak of 6.8 million units in the thirties to 4.5 million by 1960,[1] and the acreage per farm increased from roughly 155 to roughly 275 acres with a continual improvement of the farmer's financial position compared with prewar years. The enlargement of acreage per farm has improved the mix of cost items, cutting down the proportion of overhead costs and increasing the proportion of variable costs.

As it became more and more profitable to replace the horses and mules, the acreage for producing their feed shrank from 92 million in 1914 to 7 million in 1960, setting free for crops and, even more, for cattle, 85 million productive acres of land.

Simultaneously with the vigorous mechanization, the production per plant and per acre of crops and per animal has been increased. Crop yields were boosted by better cultural practices, improved seed, and more efficient protection of plants against weeds, rodents, insects, worms, bacteria, and fungi. But first and last was the better feeding of the plants with more nutrients. Among the nutrients the key factor turned out to be nitrogen. This vital element in the life-bearing proteins is mined in this country and many other industrial countries with the use of heat energy from the air. It serves as fertilizer, rocket propellant, and base for chemicals. And since plants fed with more nitrogen have rapidly increasing moisture requirements (300,000 to 400,000 gallons of water per ton of grain or cotton produced, i.e., 1,200 to 1,600 units of weight of water per unit of weight of grain or cotton produced) and "burn up" if they run short of it, farmers applied more supplementary irrigation to break this bottleneck. According to European experience, one ton of nitrogen produces 15 to 20 tons of grain equivalent, provided there is no critical shortage of water or other major growth factors. Farm application of nitrogen in the continental United States has increased from next to zero in prewar years to over 2 million tons, while simultaneously sprinkler irrigation has spread into all States of the Union. This was chiefly owing to the decline in the cost of applying the unit of water to the crops, which resulted partly from the decline in the price of aluminum pipe and motor pump units, and partly from the avoidance of costly earth movement involved in leveling the land, or of setting furrows or check dams for irrigation and dragging these down afterwards. The economic force that pushed this acceptance of better tech-

[1] This preliminary figure ignores a change in the definition of a "farm" between the 1954 and 1959 censuses of agriculture and is based on estimates of the United States Department of Agriculture. The 1959 Census of Agriculture with the new definition reported a total of only 3.7 million farms.

nology was again the increasing spread between the costs per unit of nutrient or water applied to the crop and the resulting price per unit of product. In other words, the marginal value productivity of the input has increased. This means in plain language that on most American farms fertilizer and water yield at present an increasing income as greater use is made of them, although at a future point marginal costs may approach or equal marginal revenues.

For animal husbandry the same has happened. Animals are only converters of feed. If a farmer could produce cheaper feed by putting nitrogen on irrigated pasture, he could produce milk or beef at lower cost and with more profit, if the price of these products did not drop too much. But in addition, hybridization, antibiotics, better feed mixtures, and other methods have helped to improve the input-output ratio. Owing to a reduction of the life of broiler chickens to 65 days before slaughter, and various other factors, feed requirements have been reduced to a commercially attainable ratio of 2.3:1 from formerly 4 or 4.5:1.

CAPITAL INTENSITY THE KEY TO PRODUCTIVITY

The aggregate impact on American agriculture of all this increased productivity is enormous, and has become the envy of the world. Not only have we long since prevented any contingency of food shortage, but with their unique managerial talents, their up-to-date equipment, and the unequalled services provided by such enterprises and institutions as the land grant colleges, research stations, and extension service, the American farmers have developed their giant business into the greatest chemical industry in the world, that of converting crude feed materials to animal products of much higher value. This mobile chemical industry converts roughly 355 million tons of grain equivalents—namely, 160 million tons of grain and high-protein concentrates, 125 million tons of grain equivalent in the form of forage on pastures and ranges, and 70 million tons of grain equivalent in the form of all other roughage, such as hay, silage, and other succulent feed. This is capitalism at its best, with the able capitalists in overalls on the tractors, trucks, or haybalers, or in the mechanical milking parlor. Many people do not know it, but if government payments and surplus purchases are excluded, United States farms earn $19 billion, or well over 60 per cent of their cash receipts, from sales of livestock products. Over 17 million grain-consuming and close to 100 million roughage-consuming animal units, each equivalent to one dairy cow or head of adult cattle, represent as much "capital on the hoof" in live inventories as there is in machinery inventory, namely, $18 billion in each.

The rich capital assets of American agriculture are one of the secrets of its success in raising productivity: it has the capital, which it can depreciate, maintain, or expand. In the Soviet orbit and many other countries of the world, the rulers squeeze capital out of agriculture in order to invest it in publicly owned industries, with the consequence of low productivity and waste of natural resources. A great farm income support in this country is the generous depreciation allowance for farm machinery and breeding stock under the revenue code.

For the farm equipment and machinery industry and the endless variety of their auxiliary industries it is vital to realize that in the future agriculture in the United States is bound to go even farther in the direction of more livestock

business. Hence, concentration on labor saving devices and automation for every part of livestock operation seems an inevitable orientation of business.

A few basic data may be helpful to sum up what this huge business of agriculture amounts to in terms of output and of transportation of goods. With no more than 8.5 per cent of the nation's continental labor force, or 7.4 million workers, it produces in a single year—in very rough and rounded terms—*175 million metric tons of grain, 20 million tons of oil-bearing crops, 2 million tons of sugar, 20 million tons of meat and eggs, 60 million tons of milk, and 40 million tons of fruits and vegetables (including potatoes)—a total of 317 million tons of edible products. To this would be added 3 million tons of cotton, 1 million tons of tobacco, 110 million tons of hay, and 70 million tons of fuel wood and timber, or a grand total of 500 million metric tons of major products.*

An appropriate measure for the magnitude of these figures is best provided by a comparison with the productivity of Soviet Russia's agriculture. After 40 years of a brutally enforced experiment of collectivization, it produces with 4½ times the number of farm workers (33 million) one third as much meat (7 million tons) as do the farmers of the United States; and even of grain, most of which Soviet Russia's farmers eat rather than feeding it to livestock, they produce only 60 per cent of the American output. This in spite of an abundance of natural resources in Europe and Asia. One American farmer produces food for himself and 24 others. One Soviet farmer produces enough for himself and four others.

The essence of the dynamic change in American agriculture with reference to the concept of the farm problem is not only the segregation of all separate crafts, the change from a "do-it-yourself economy" to more and more division of labor and the rise of the urban economy, but the utter dispersion of the business of producing food, feed, and fibers throughout the entire modern economy. It is absurd to believe that in 185 years the technological revolution has shrunk the proportion of the national input of labor to the production of food, feed, and fibers, measured in comparable terms, from 90 to 10 per cent. This share never was 90 per cent to begin with, as was demonstrated, and it has not shrunk to 10 per cent by a long shot. If one defines the farmers as members of the active labor force who produce food, feed, and fibers, then the modern economy has farmers in nearly all commercial, industrial, and service enterprises. In the Middle Ages the allocation of manpower in the economy was divided into the Food Estate, the Defense Estate, and the Educational Estate. It is beyond question that in the highly developed economy less manpower is allocated to the Food Estate and more to the Educational Estate (health, education, welfare, arts, and religion), but the extent of the change in allocation is indefinite. If one takes the rather defective estimate of the Gross National Product (GNP), which substantially underrates the real output of goods and services, one finds that in a GNP of roughly $500 billion with $331 billion total consumer expenditures, food, beverages, and tobacco absorbed roughly $94 billion of the latter, or over 28 per cent.

However, the dynamic structural and operational change within the agricultural economy both on and off farms during the last 50 years has been so enormous that it does not make sense to apply any formula for comparisons of per

capita income or share of national income over time between different "sectors" of the economy. The economy is not organized in sectors, but in widely dispersed and interlocked functions. Hence the parity formula with its historical base is, on the ground of profound structural changes alone and aside from many others, a totally discredited and impermissible statistical tool, irrespective of revisions in the definition. In a society that stands on the principle of social mobility and economic progress with freedom, attempts at measuring social justice and equality by a sort of comptometer expose the inadequacy of our advanced statistical tools in national economic accountancy whenever such lofty values and intangibles are involved.

The real cause of the dramatic structural change and advancement in productivity in American agriculture during the last two decades was not an explosive forward jump of technology as such, but the successive application of a multitude of new means and methods, all leading to a reduction in costs per unit. This was achieved by investing more and more capital per man on the farm. As a result of all this, agriculture today is just as commercial as, and even more capital-intensive than, industry and commerce. Of course, this enviable record of agriculture is merely one important facet of the highly integrated performance of the entire economy of a very resourceful nation which is guided by an alert social conscience and accepts economic progress and constant adjustment as a challenge and duty. It cannot be entirely explained by the affairs on the farm nor can it—even for purposes of economic analysis—be emancipated from any part of the functions of the high velocity of exchange of goods and services throughout the economy.

SELECTED LITERATURE

[U.S.] *Economic Report of the President, Transmitted to the Congress January 20, 1960,* Appendix B, "Some Recent Economic Developments. III. Agriculture," pp. 100–10 (obtainable as separate from U.S. Dept. Agr.), and Appendix D, "Statistical Tables Relating to Income, Employment, and Production," pp. 229–36.

Ibid., January 18, 1961, Appendix B, "Some Recent Economic Developments. II. Agriculture," pp. 93–106, and Appendix C, "Statistical Tables Relating to Income, Employment, and Production," pp. 201–08.

"Titan in Transition: Food Processing, Nation's Largest Industry," *News Front,* November 1960, pp. 32–37.

J. H. Davis and R. A. Goldberg, *A Concept of Agribusiness* (Boston, 1957).

U.S. Dept. Agr., Agr. Res. Serv., *Farm Costs and Returns: Commercial Farms by Type, Size, and Location* (Agr. Inf. Bull. 230, June 1960).

———, *The Balance Sheet of Agriculture* (issued annually in November from 1940 to 1959; latest issue, Agr. Inf. Bull. 232, August 1960).

U.S. Dept. Agr., Agr. Mktg. Serv., *Agricultural Outlook Charts, 1961* (November 1960).

S. H. Schurr, B. C. Netschert, Vera F. Eliasberg, Joseph Lerner, and H. H. Lansberg, *Energy in the American Economy, 1850–1975* (Baltimore, 1960).

MERRILL K. BENNETT AND ROSAMOND H. PEIRCE

CHANGE IN THE AMERICAN NATIONAL DIET, 1879–1959*

The primary purpose of this paper is to describe, and in minor degree to analyze, the more conspicuous trend changes in the American national diet during the eight decades 1879–1959; and to consider what further changes appear to be probable in the decade 1960–70. A secondary purpose is to present in condensed and somewhat unusual form historical-statistical data on per capita "consumption" of important foods or foodstuffs individually and of less important ones in affiliated groups (Appendix Tables I–III). It is hoped that these tables will prove useful to students of national food utilization as compact though comprehensive reference materials. The meaning of the word "consumption" is examined in the first section below.

The basic statistics of national food consumption are official, as estimated by the United States Department of Agriculture annually beginning with 1909, in comprehensive publications of which the first appeared in 1949 (*1*), the second in 1953 (*2*), subsequently supplemented and revised (*3; 4*). Here we do not deal with annual data, but, in the interests of condensation and in order to focus attention upon long-term trends, with three-year averages spaced a decade apart.

In order further to describe and emphasize long-term trends, we have prepared estimates, designed to be comparable with the official data that date from 1909, for the earlier decennial census years 1879, 1889, and 1899. While the procedures in preparing these pre-1909 estimates are not described here, they are available in multigraphed form to interested students on request. In the charts which follow, we treat the estimates for 1879, 1889, and 1899 as if they represented three-year averages centering on the census years.

It will be observed of the three Appendix Tables that each refers to national consumption per capita of 40 foodstuffs, foods, or groups of these. Prior to 1940, the figures refer to the total population of the United States but after 1940 to the civilian population; and the youngest states, Alaska and Hawaii, are not covered by the statistics. Table I expresses the data in terms of pounds consumed per

* This study has been facilitated by a grant of funds from General Mills, Inc., made in 1952 in support of a study (unpublished) of trends in the consumption of grain products. Full responsibility for methods and findings lies with the authors, who have had the advantage of critical readings of manuscript by their colleagues, Helen C. Farnsworth and V. D. Wickizer, and by Dr. Marcus A. Krupp of the Palo Alto Medical Research Foundation and Miss Phyllis Ullman, nutritionist, of the Palo Alto Medical Clinic.

capita per year; Table II, in terms of calories consumed per day. Table III, based on Table II, shows the percentage contribution of each of the 40 food groups to total calories consumed. Only the data in Table I (after 1909) on poundage of foods consumed per capita per year, and on *total* calories consumed per capita per day as in Table II, are derived directly from official publications. Official estimates of poundages consumed per capita per year, if fully presented, would involve more than 200 series, which in the interests of condensation we have by selection and combination reduced to 40. In Table II, the data on calories consumed per capita per day, aside from the grand total, represent our calculations.

It appears desirable at the outset to stress the probability that errors exist in the statistical picture of changes in per capita consumption here given in tables and charts. The number of food items actually consumed is so large that complete statistical coverage seems too much to expect, and indeed there is deliberate omission of alcoholic beverages. It is not possible to estimate with precision even the national production for example of potatoes or milk, to say nothing of the fractions "consumed." Again, conversion of poundages per capita to calories per capita is not an exact operation, and even decennial counts of the human population may have their margins of error. We have accordingly chosen here to focus attention on changes statistically so conspicuous as to seem likely to represent historical fact.

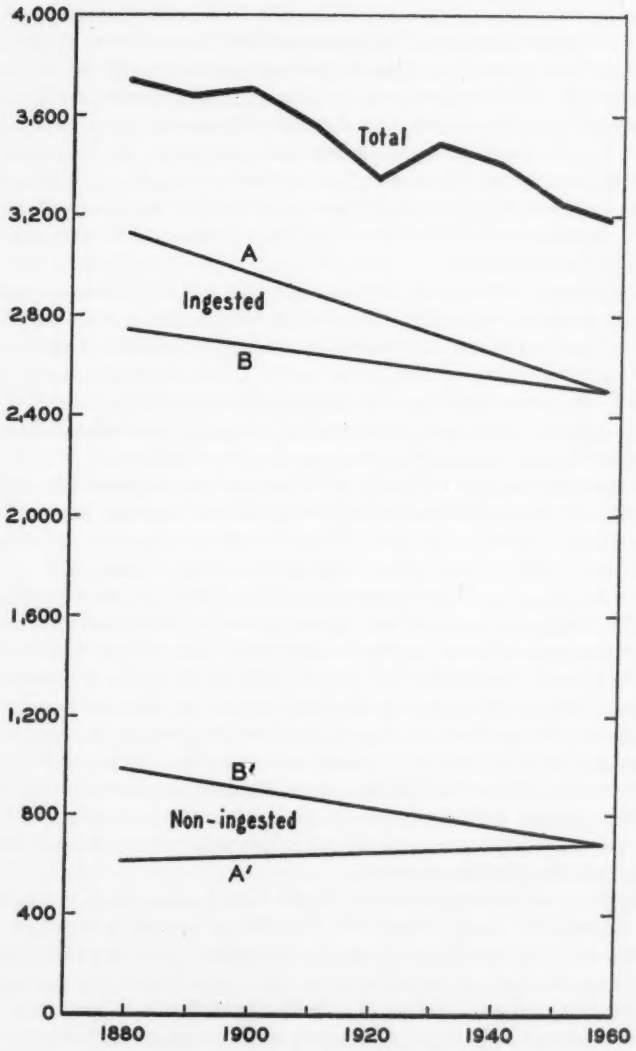
TOTAL FOOD CONSUMPTION (AND INGESTION)

A conspicuous feature of American food consumption over the past eight decades is a tendency for food-calorie consumption per person per day to decline rather persistently, as indicated by the upper line in Chart 1. From 1879 to around 1958, the decline approximated 550 calories or nearly 15 per cent; from around 1910, when the official statistics begin, to around 1958, the decline was about 365 calories or 10 per cent.

Measured in terms of pounds of food consumed per capita per year, the decline is smaller: about 9 per cent from 1879 (1,615 pounds) to 1958 (1,475 pounds), about 8 per cent from 1910 to 1958. The smaller decline in weight than in calorie content of all food consumed per capita reflects change in the composition of the national diet. Foods relatively high in calorie content per pound, weighing about 898 pounds per capita around 1879, had come to weigh only 673 pounds by 1958, while foods relatively low in calorie content per pound (such as milk, fruits, and vegetables) had risen in per capita consumption from some 717 to 802 pounds.

The extent of decline in calories consumed per capita per day, 550 over eight decades or 365 over five more recent decades, appears sufficiently large to be factual rather than a mere reflection of inaccuracy of accounting. On meager evidence we suppose that omissions, the bulk of them representing the alcoholic beverages, would not have exceeded 200 calories per capita per day or have fallen below 100 calories even in the three-year periods 1919–21 and 1929–31 affected by national prohibition, when there was nevertheless a good deal of officially unrecorded production and consumption of alcoholic drinks. If the variance was in fact only of such magnitude, the general trend of consumption of all food

CHART 1.—TOTAL FOOD CALORIES CONSUMED PER CAPITA PER DAY IN THE UNITED STATES, AND HYPOTHETICAL CALCULATIONS OF PORTIONS INGESTED AND NOT INGESTED, FROM 1879*



* Basic data from Appendix Table II; see text for calculations.

calories per capita per day, while moving at a higher level, would be little affected as to direction and magnitude of change.

What the trend of per capita consumption of food calories may have been

between 1800 (say) and 1879—whether downward, horizontal, or rising—seems indeterminate on the basis of existing statistics. If our estimates of levels of per capita calorie consumption around 1879, 1889, and 1899 are reasonably dependable and comparable with the official estimates after 1909, they suggest that definitive downturn may have begun around 1900, since it is not clearly in evidence earlier but appears from decade to decade thereafter with the exception of the decade 1920–30. The exceptional three-year period following 1899 is 1919–21, when per capita calorie consumption fell below the general trend apparent from 1899 to 1959. Possibly the high postwar food prices of 1919–20, coupled with high unemployment in 1921, prompted an unusual exercise of household economy in the nature of curtailing household waste; but we are unable to marshal specific evidence. It seems unlikely, however, that human ingestion of food would have been appreciably curtailed.

"Consumption" of food calories represents, in a way that cannot be exact, what food exists at "retail level," or is made available for purchase for table use by the civilian population. It represents both food that is ingested and food that escapes ingestion largely by wastage and spoilage although it may be said to be "destined" for human ingestion. The question inevitably presents itself whether the decline in total estimated per capita food "consumption" reflects downward drift solely of ingestion, solely of noningestion, or of both.

The four lower lines on Chart 1 point to various possibilities. We may first assume that in recent years the level of per capita food ingestion has stood in the neighborhood of 2,500 calories daily. Some nutritional scientists might hold the opinion that such a figure is rather above than below the middle of the probable but unmeasured range. Many reasons could be advanced to support the probability that daily per capita calorie ingestion has declined, chief among them being continuing reduction in physical activity of the average adult person as mechanical power has supplanted human effort, on the farm, in industry, and in the home; and diminishing degree of exposure to cold weather accompanying reduction of outdoor winter work, improved indoor heating, and some shift of population to milder climates. Probably conscious effort to restrain food intake has had some effect, more in late than in early decades. It seems improbable that increase in average adult body size (height), while it has occurred and would tend to increase ingestion, could significantly have offset these influences working toward lower food intake per person.

If ingestion of calories per capita should have been as much as 25 per cent higher around 1879 than around 1958, the drift of per capita ingestion would have been as hypothetically shown by line A on the chart; and so large a downward change in ingestion would imply a small trend increase in noningestion, as hypothetically shown by line A′. On the other hand, if per capita calorie ingestion had been only 10 per cent higher in 1879 than around 1958, noningestion per capita would have been falling, not rising, and about as much as ingestion (line B and line B′). There appears to be no conclusive evidence regarding the amount by which per capita calorie ingestion has fallen. As to noningestion, conflicting major influences have presumably been operating: on the one hand, numerous improvements in preservation of food in and between retail establishments and homes (storage, transport, packaging, canning, refrigeration); on the

other hand, rising per capita income, such as might give wider scope to wastage of remnants and scraps.

There has certainly been increasing economic scope for wastage of food. The gross national product (GNP) per capita—an indication of per capita money income—is estimated to have risen from about $210 in 1889–93 to about $2,620 in 1957–59 (*5*, p. 139; *6*, p. 8). Consider the cost at retail of a "basket" of important foods, comprising 172 pounds of wheat flour, 29 of corn meal, 102 of sugar, 138 of white potatoes, 17.8 of butter, 19.2 of bacon, 13.0 of lard, 44.4 of pork chops, 38.8 of round steak, 40.4 of eggs, and 272.7 of whole milk. Such a "basket" roughly represents per capita annual consumption around 1930; it would provide about 2,500 calories per day, more than two-thirds of total calorie consumption in any period; the commodities included are the only ones for which we find retail prices reported as early as 1890 and also as late as 1959. This basket would have cost about $47 in 1890–91 and about $198 in 1957–59. With the per capita GNP of 1889–93, about 4½ such baskets of food could have been purchased. With the per capita GNP of 1957–59, about 13 baskets could have been purchased.

Such a calculation, while inevitably inexact, indicates clearly enough that the population has been in a position both or either to expand continuingly its savings and its purchases of the many nonfood elements in the family budget, or to shift the composition of the family diet increasingly toward relatively expensive foods, or to become increasingly tolerant of food wastage. In the matter of waste or noningestion of food calories per capita, however, no firm conclusion about even the direction of long-term trend seems tenable at present, although decline in per capita ingestion seems highly probable though not measurable.

The amount of noningestion of the food calories that were available at retail level—between 600 and 1,000 calories per day on the assumptions lying behind Chart 1—seems almost incredibly large. Perhaps the basic assumption that actual ingestion has recently stood at only 2,500 calories per day is in error. Our knowledge of food consumption would be appreciably enhanced by a scientific statistical inquiry on that point, as well as upon the volume of noningestion and its components. Of any particular group of foods or any particular foodstuff, as with food in general, we cannot now be certain what fraction is ingested and what fraction is not. Observation may suggest that a high proportion of caloric noningestion occurs with the fatty portions of meat and the fractions of bready items which became stale, yet the truth even of this calls for verification. Waste from potatoes, vegetables, and fruits, while no doubt considerable in weight, could hardly be of high importance in calorie noningestion.

CHANGE AMONG COMMODITY GROUPS

The long list of food items of which the national consumption is officially estimated can be arranged into several sorts of groupings. If, for example, one wishes to know how the decline in total food-calorie consumption per capita was reflected respectively in animal and in vegetable products, the answer can be given that it was wholly in vegetable products. Per capita consumption of animal products from decade to decade has held within almost as narrow a range as 1,200–1,300 calories per day, whereas calories derived from vegetable products

have fallen from nearly 2,500 to somewhat below 1,900. In percentage terms, and in view of decline in the total, animal products have risen from 34 to 41 per cent of the whole, while vegetable products have fallen from 66 to 59 per cent.

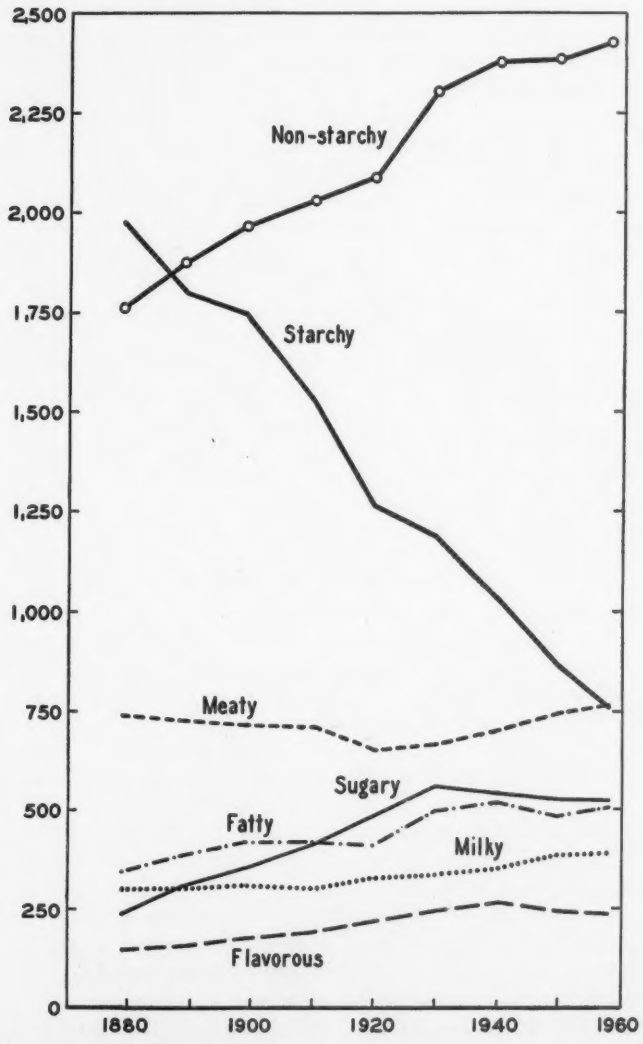
Again, the foods might be grouped with reference to their principal sources of origin in crops and in livestock herds. Such a classification would show broadly that calories per capita derived from the cattle herd have tended to rise a little while those from the pig herd have tended to fall slightly; a great decline appears in calories from the grain crops; a rise, notable until the 1930's but not thereafter in calories from sugar cane and beet; and a rise of moderate magnitude in calories per capita from all other sources, especially oilseeds and the national poultry flock.

A different grouping will serve present purposes. By and large, housewives and restaurateurs concerned with preparation of daily meals may be said to assemble them from principal groups of foodstuffs reasonably to be designated as starchy, fatty, meaty, sugary, milky, and flavorous. Examples of members of such groups are wheat flour and corn meal; butter, lard, and salad oil; beef, pork, chicken, and eggs; granulated sugar and honey; whole milk and cream; oranges, apples, tomatoes, onions, and cabbage. It seems probable that the American heavy meal of the day, whether taken at noon or near dusk, is and long has been typically constructed from a combination of items commonly drawn from all six of these principal groups. The evolution of the national diet can reasonably be regarded as shift of emphasis, brought about by the choices of consumers, among the food groups contributing to the principal daily meal.

Chart 2 shows that only one of the six groups of food, the starchy, has tended over eight decades to decline uninterruptedly in per capita consumption, whereas the other five groups taken together have provided an increasing number of calories per capita from decade to decade. Per capita calories from starchy foods have obviously declined much more than calories from all foods, as evidenced by the rise in calories from nonstarchy foods in the aggregate. The starchy staple ratio (percentage of total food calories derived from starchy foods) has fallen from about 53 per cent around 1879 to some 24 per cent around 1958. In 1879 per capita calories from starchy foods were 112 per cent of calories from all other food; by 1958 the starch-food calories were only 31 per cent of the nonstarchy. This decline in the consumption of starchy foods relative to the total, while consumption of the nonstarchy rises, is the most conspicuous feature of long-term change in the composition of the national diet.

The change appears explicable basically as a reflection of mass consumer choice implemented overwhelmingly by persisting increase in per capita real income. It hardly seems credible that consumers have been influenced over close to a century to exercise such choice chiefly through either advertising or nutritional counsel. Nor can evidence be mustered to show what might well be taken as an effective influence: an increase in the price of starchy foods relative to the price of nonstarchy foods. Meager evidence on the contrary suggests that as a group, though by no means individually, the nonstarchy foods have risen in price, from around 1890 to around 1958, somewhat more than the starchy foods. Thus 20,000 calories made up equally of wheat flour, corn meal, and potatoes, would have cost at retail in 1890 about 56 cents and around 1958 about $2.25, a fourfold increase in price. But 20,000 calories made up equally of sugar, butter,

CHART 2.—CONSUMPTION PER CAPITA PER DAY OF CALORIES DERIVED FROM SIX MAJOR FOOD GROUPS, FROM 1879*



* Data from Appendix Table II. Nonstarchy, not shown there, is total calories minus calories from starchy foods.

bacon, lard, pork chops, round steak, eggs, chicken, and milk would have cost at retail $2.29 around 1890 and $10.86 around 1958, nearer a fivefold increase. On the whole, long-term price changes thus appear in themselves to have been such as might have prompted the starchy staples to rise in consumption, not to fall.

This is not to say, however, that changing relative prices have had no probable influence whatever on the commodity composition of the diet. What can be said is that one finds contradictory indications of price influence. Thus from 1890 to around 1930 per capita consumption of sugary foods was persistently rising while that of wheat flour (at least from 1899) was persistently falling; and these trends of consumption accord with change in relative retail price, for over those 40 years sugar prices fell in relation to wheat-flour prices, declining from 3.6 to 3.4 cents per 1,000 calories, while wheat-flour prices rose from 1.8 to 2.7 cents. Yet from 1930 to around 1958 sugar prices continued to fall in relation to wheat-flour prices, while sugar ceased to rise in per capita consumption and wheat flour continued to fall. Notable also is a persistent rise in per capita consumption of milky products, among which whole milk is dominant. This rise took place concurrently with the decline in flour consumption in spite of the fact that there was no change in the milk price relative to wheat; between 1890 and 1958 whole-milk prices rose from 10.2 to 37.8 cents per 1,000 calories, wheat-flour prices from 1.8 to 6.6 cents, with milk prices 5.7 times those of flour in both periods. Thus the trend changes in composition of the national diet seem explicable at best in small or moderate degree as response to changing price relationships. With the wider range of choice permitted by steadily increasing per capita income, people over the decades have chosen to diversify their purchases, retreating from the once-predominant starchy group of foods toward each of the nonstarchy groups—not, presumably, in utter disregard of price relationships, but surely without much clearly perceptible governance by them. If diversification of diet were to occur, it seems expectable that foods commonest in the early years—the starchy staples—should be the group to be selected for reduced intake.

Over the whole period, the five nonstarchy food groups have not, as Chart 2 shows, advanced with identical regularity and to identical extent. The sugary group has risen most between 1879 and 1958, more than doubling with an increase of 285 calories per capita. The fatty group, increasing by 163 calories, shows the increase of second magnitude. With increases of 96 and 88 calories respectively, the flavorous and milky groups follow, while meaty products show an increase of only 29 calories per capita.

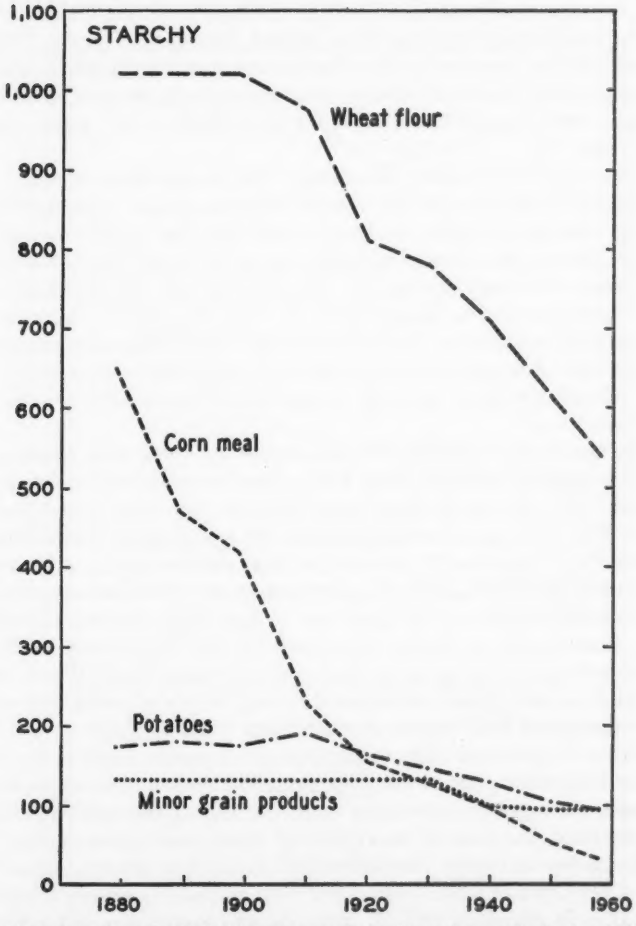
But if one looks at developments over only the past three decades, since 1930, the trends are quite different. In that period only the meaty and the milky groups increased definitively in per capita consumption of calories; others held about unchanged, though sugar has fallen somewhat. Thus, over the whole period and considering all six commodity groups, it is only the starchy and the milky that show persistent trends. Trends of the meaty and the sugary groups have reversed themselves. The trends of the fatty and the flavorous groups, on the whole upward until around 1930, appear nearly horizontal thereafter.

What has happened to any of the six groups of food may not be reflected, however, in each of the components of a group. To make the record of change more complete, we consider those components next.

COMPONENTS OF COMMODITY GROUPS

The group of starchy foodstuffs, which alone among the six major groups has persistently lost public favor, may conveniently be arranged into component parts shown in Chart 3 as wheat flour (including semolina), corn meal and flour,

CHART 3.—CONSUMPTION PER CAPITA PER DAY OF CALORIES DERIVED FROM FOUR COMPONENTS OF THE STARCHY FOODS, FROM 1879*



* Data from Appendix Table II. Potatoes are both white and sweet (Series 4 and 10).

potatoes (white and sweet), and minor grain products. The group of minor grain products comprises milled rice, wheat cereal, corn cereal, cornstarch, hominy and grits, rye flour, buckwheat flour, oat food products (mostly oatmeal), and barley products (meal, pearl barley, malt not for brewing).

Each of these four subgroups of the starchy foodstuffs has shared in the general decline. Loss of public esteem naturally had its strongest impact upon the subgroups standing highest in consumption in early years, the wheat flour and the corn meal. If the pre-1900 estimates are to be trusted, corn meal declined most, by over 600 calories per head per day from 1879 to 1958. Somewhere between 1900 and 1910 corn meal lost (to sugar) its position as the second most important single foodstuff in the national diet as a source of calories, and by

1958 had become a minor source, scarcely more important than peanuts. The public retreat from wheat flour, the leading single source of calories for eight decades, began later, around the turn of the century. As yet the decline in daily per capita consumption of wheat flour, around 480 calories between 1900 (or 1879) and 1958, has been smaller than that of corn meal though otherwise larger than with any other foodstuff. Decline in consumption of potatoes seems not to have begun until after 1910, and of minor grain products as a group perhaps not until after 1930.

Detailed evidence is lacking concerning what end-products of wheat flour have borne the brunt of the decline. But the common opinion appears valid that bread and biscuits, especially the home-baked, have lost much more ground than cakes, pastries, doughnuts, and other sweet goods made largely with wheat flour. Perhaps flour-thickened gravies have lost ground. Whole-wheat bread may have gained somewhat, though not to the extent desired (to judge by recommendations) by nutritionists. On the other hand, cooked alimentary pastes made from semolina—here merged statistically with wheat flour—have risen from about 4 pounds per capita generally around 1909 to around 6–7 pounds four decades later.

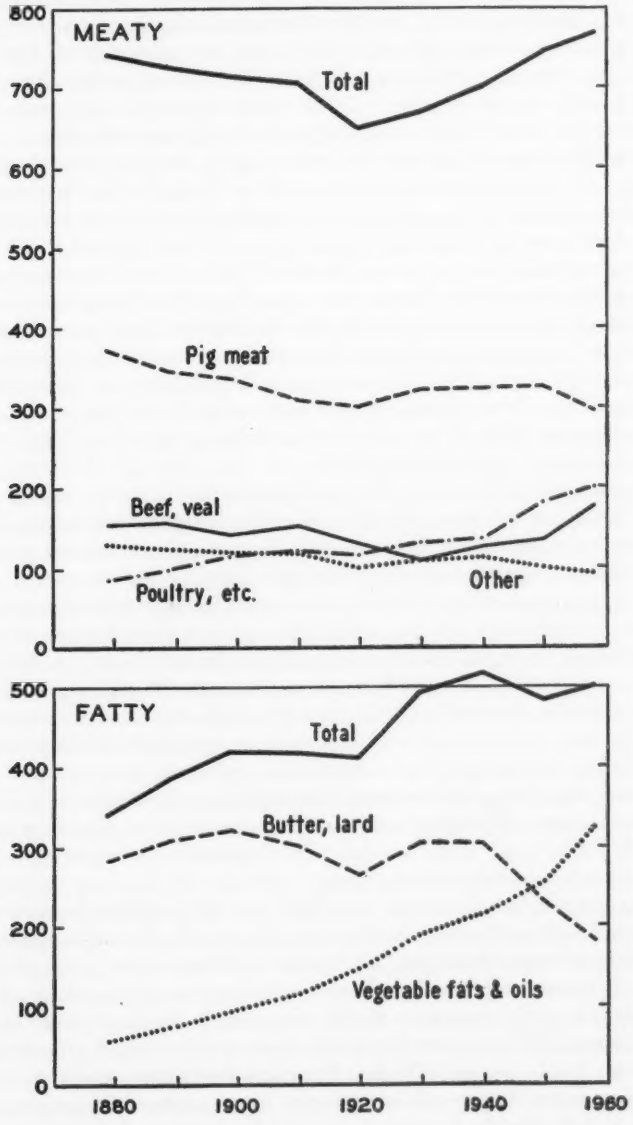
Of the nine items comprising the minor grain products, none has increased as much as semolina has done from 1909, when the official accounting begins, to around 1958. Cornstarch, corn cereal, oatmeal, and wheat cereal have increased a trifle in per capita consumption over the whole period. Milled rice, rye flour, hominy and grits, barley products (for food, not brewing), and buckwheat flour have definitely fallen, the last nearly to the point of disappearance, although only the rye and the buckwheat flour seem to have fallen in consumption consistently from decade to decade. Statistically at least, there were moderately conspicuous bulges in the use of rye flour and rice during World War I; and in barley products, corn cereal, and oatmeal during the era of prohibition ending in 1933—perhaps in some degree associated with home brewing.

While the decline in per capita consumption of all potatoes began in the decade following 1910, white potatoes lost favor first. The decline in sweet-potato consumption is not suggested statistically until after 1920. Conceivably food habits in the southeast, the national stronghold of sweet-potato consumption, were somewhat slower to change than elsewhere. In absolute amount, annual consumption per capita of white potatoes fell from around 181 pounds at the peak in 1909–11 to 98 pounds in 1957–59. Sweet-potato consumption declined less in weight, from 34 pounds in 1919–21 to 9 pounds in 1957–59, but more in terms of percentages. There are now probably few localities where the sweet potato remains the staple food that once it was.

In spite of its heavy decline in per capita use, wheat flour remains the preferred item in the group of starchy foodstuffs. It contributed 51.5 per cent of all starch-food calories in 1879, and decade by decade without interruption the percentage grew larger, to reach 70.8 per cent in 1957–59.

The group of meaty foodstuffs, which by 1958 had come slightly to exceed the group of starchy foodstuffs as a source of national food calories, is not dominated by any single component to the degree in which wheat flour has dominated among the starchy foodstuffs. Meat from pigs, however, has regularly contributed more calories than any other product, as shown in Chart 4—slightly more

CHART 4.—CONSUMPTION PER CAPITA PER DAY OF CALORIES DERIVED FROM FOUR COMPONENTS OF THE MEATY FOODS AND TWO COMPONENTS OF THE FATTY FOODS, FROM 1879*



* Data from Appendix Table II. Pigmeat is lean pork plus bacon and saltside (Series 25 and 26).

than half of the group total around 1879, but considerably less than half by 1958; pigmeat in both its components, lean pork and bacon and saltside, has lost in relative importance among the meaty foodstuffs. This is even more consistently evident of the heterogeneous group of "other" meaty items, which includes offals, game, fish, lamb and mutton, and also dried beans and peas, which though vegetable products are commonly used as meat stretchers or substitutes. During the past three prosperous decades, for which the basic data are presumably the most reliable, public preference seems to have turned somewhat away from the pigmeat and the "other" products (as a group, though not with respect to offals and game), in favor of beef and veal and of a group made up of fowl, eggs, and cheeses. Per capita consumption of fowl and of cheese has doubled since 1930. Increased efficiency in the production of poultry accompanied by reduction in relative price may well have influenced the recent sharp upward trend of fowl consumption, more notable after 1940 than before. Poultry meat has risen in per capita consumption much more than eggs; the tendency has grown to slaughter the birds before egg-laying has begun. On the other hand, price changes are not helpful in explaining the larger rise in beef consumption per capita between 1930 and 1958 (from 39 to 65 pounds annually) as compared with lean pork (a decline from 44 to 41 pounds), for retail prices per pound of round steak rose by 60 cents (from 41.3 to 101.7 cents) while prices of pork chops rose by 53 cents (from 34.4 to 87.9 cents).

Pigmeat and beef contain substantial proportions of fat as well as of lean meat. While statistics are unavailable, observation suggests that the lean fraction has always been predominantly ingested. To those whose memory spans four or five decades, observation might well suggest that over the years there has been, on the contrary, a tendency for more and more of the fat fraction of meats cooked in homes and restaurants to escape ingestion and end up as scrap or in garbage.

In the last few decades there may well have been changes in public esteem of the various end-products of beef and pig carcases. Observation suggests but does not clearly demonstrate, with respect to beef, that stews and roasts have fallen in favor as compared with such items as steaks, ground fresh beef, and frankfurters. Salt fat pork in various forms, and roasts of fresh pork as well, may have lost prestige as compared with cured pork such as ham and bacon. Luncheon meats of varying composition appear to have gained ground. In general, public favor seems to have turned toward items requiring relatively little of the housewife's time to prepare.

The group of fatty foodstuffs includes on the one hand the animal products, butter and lard, on the other hand shortenings, edible oils, and margarine that are chiefly of vegetable origin. The group total has tended erratically to rise in per capita consumption, though with a tendency to stabilize during the past 30 years (Chart 4). Decade by decade the vegetable fats have gained in public favor: around 1879 they contributed only about a sixth of all calories from fatty foodstuffs, but by around 1958 their fractional contribution had risen to more than three-fifths. The rise of vegetable fats in per capita consumption over the period of eight decades is equaled, among all subgroups of the six main commodity groups, only by the increase in consumption of cane and beet sugar.

Since around 1910 at least, the gain in the three components of vegetable-fat consumption to around 1958 has been greater in edible oils (9.3 pounds per

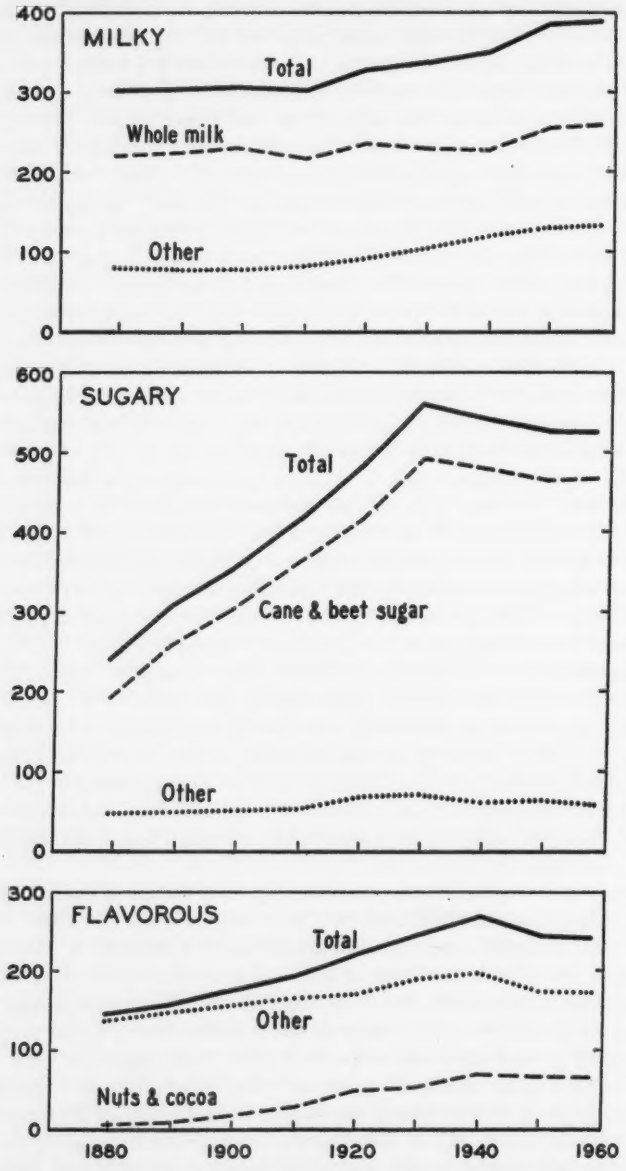
capita) than in margarine (7.6 pounds), in margarine than in shortening (3.4 pounds). The culinary drift toward salads has been notable. So also has been substitution of margarine for butter, a conspicuous change in composition of the national diet especially over the past two decades, associated with relaxation of legal restraints upon the coloring of margarine and improvement in quality, flavor, and vitamin content of margarine itself. From 2.5 pounds per capita around 1940, consumption of margarine had risen to 8.9 pounds by around 1958, while consumption of butter had fallen by an even larger amount, from 16.8 to 8.3 pounds. While butter prices per 1,000 calories have consistently much exceeded margarine prices, the disparity appears not to have been notably effective on consumption until the two products came to resemble one another closely. In the two decades following 1940, though not earlier, public favor turned against lard as well as butter, lard consumption per capita declining from 13.6 to 9.4 pounds between 1939–41 and 1957–59, with most of the decline occurring after 1950. A moderate rise of 1.4 pounds in consumption of vegetable shortenings (solid fats) compensated for only about a third of the decline in lard consumption.

Not all of the fat in national food purchases is encompassed in the group of fatty foodstuffs; as was noted above, the meaty foodstuffs contain large quantities of fat, especially the bacon and saltside from pigs. Official estimates for 1957–59 imply an average daily per capita consumption of 1,323 calories of fat from all foodstuffs, as against only 503 calories from the group of fatty foodstuffs as here defined. The total of fat calories purchased per capita has risen by 15–16 per cent from either 1909–11 or 1919–21 to 1957–59, and the proportion of fat calories to total food calories has increased, partly because of decline in total calories, from about 32 to about 42 per cent. The apparent high level of fat consumption per capita and its increase have given concern in many quarters, in view of the presumably increasing prevalence of diseases of the heart and the currently accepted causal relation between high consumption of saturated (generally, the solid) fats and incidence of some heart diseases. The statistics of fat consumption, however, cannot be confidently interpreted as evidence of fat ingestion. The relative levels of ingestion and noningestion are not known; hence upward trend of per capita fat ingestion, if factual, must be shown to be so by data other than that afforded by the statistics considered here. Still less is known about the trends of per capita ingestion respectively of the saturated and of the unsaturated fats.

Changes in per capita consumption of milky foods have not been spectacular. Except perhaps between 1900 and 1910, their consumption has risen steadily, though only moderately, from decade to decade since 1879 (Chart 5). The largest component, whole milk consumed as such and in ice cream, has risen less than the summation of other milky products, which as charted does not include butter or cheese but comprises a wide range of minor items: cream, liquid skim milk and buttermilk, condensed and evaporated milk, dried skim milk, and others. Opposed trends appear within the group of "other milky products": little change in consumption of cream; strong increases in consumption of evaporated and condensed milk totaled and in miscellaneous milk products including the dried skim milk; and decline in the low-calorie liquid skim milk and buttermilk despite probable expansion of urban use of liquid skim milk in recent years.

If one includes with "milky products" the butter and cheese here counted

CHART 5.—CONSUMPTION PER CAPITA PER DAY OF CALORIES DERIVED FROM TWO COMPONENTS OF THE MILKY FOODS, TWO COMPONENTS OF THE SUGARY FOODS, AND TWO COMPONENTS OF THE FLAVOROUS FOODS, FROM 1879*



* Data from Appendix Table II. Nuts and cocoa includes peanuts, as well as tree nuts and cocoa (Series 11 and 15).

respectively among the fatty and the meaty food groups, the total, measured in calories per capita, tends to run three times larger than the beef and veal also derived from the herds of cattle. But the relationship is variable, perhaps mainly in reflection of cycles in beef-cattle herds and slaughter not shared by dairy herds and milk output. The conspicuous change in items derived from total milk output in the decades from 1929–31 has been the relative decline of butter consumption; it has been compensated chiefly by increased consumption of cheese, whole milk, condensed and evaporated milk, and dried skim milk.

From 1879 to 1930–31, the group of sugary foods increased more rapidly in per capita consumption than any other major group, and the same may be said of the period 1879–1959 although consumption per head of sugary foodstuffs ceased to increase in the later 1920's. In the absence of detailed knowledge of shifting preferences for such end uses as baked goods, hot and cold beverages, candies, ice creams and sherbets, canned fruits, and others, it seems difficult if not impossible to explain why per capita use of the sugary foodstuffs increased so sharply and consistently for nearly five decades and then ceased to grow. Replacement of starchy foods by the sugary seems somewhat unlikely to have been stimulated sufficiently to prompt the great increase in consumption either by expanding incomes or by change in relative prices. Perhaps in the 1920's a saturation point was reached, as would eventually occur with any affiliated group of foodstuffs so long as human ingestion placed a ceiling upon consumption per capita of all food.

It is the cane and beet sugar which have changed so greatly in per capita consumption; the beet may have gained a little on the cane in the last 50 years. Observation suggests that refined sugar has gained on the darker types. In addition to cane and beet sugars, the sugary group includes corn sugar and a list of sirups comprising maple, cane, refiners, edible molasses, sorgo, and honey. As Chart 5 shows, per capita consumption of all these items together, in calories, was at the beginning of the period a far smaller fraction of the sugary-group total than was cane and beet sugar and the fraction grew smaller until the late 1920's. So far as there has been increase in per capita consumption of these minor sugar items either from 1879 or 1909–11 to 1957–58, it has appeared most notably in corn sugar and corn sirup. When sugar supplies were short in World War I, and sugar was rationed in World War II, there were conspicuous bulges in consumption of corn sirup. Honey and refiners sirups have held their place since 1909–10; decline has occurred in per capita consumption of cane, sorgo, and maple sirups, and in edible cane molasses.

The last of the six major food groups, here called flavorous (Chart 5), is notably heterogeneous in composition including a long list of fruits, a long list of vegetables, canned soups and canned baby foods that contain some animal products and starchy items, and peanuts, tree nuts, and cocoa. In terms of calorie content, the flavorous group of foodstuffs has consistently run lower than any other of the six major food groups (Chart 2, p. 101). So much can be said despite doubtful validity of estimates, illustrated by the fact that between a third and a half of the calories assigned to this group represents no more than a residual calculation—the difference between estimates of total per capita calorie consumption and the sum of (a) calories estimated to be contained in the five major food groups discussed above and (b) calories estimated to be contained

in a rather short list of flavorous items including fresh apples, peaches, melons, bananas, oranges, tomatoes, onions, and cabbage, and dried fruits, shelled peanuts, tree nuts, and cocoa. The calorie values per pound of practically all items except the last-named four are notably low. Hence by comparison with other major food groups, calories consumed per capita of the flavorous foods appear much less prominent than poundages consumed per capita. Of the total weight of food consumed per capita annually in 1949–51, more than a fourth—about 400 pounds—was the weight of fruits and vegetables (excluding potatoes). This fraction could be equaled only by the weight of milky products. But the calories in the flavorous group made up only 7 or 8 per cent of total calories consumed per capita. The large poundages are eaten not to assuage hunger but to satisfy palates.

Up to and around 1940—if the data are broadly dependable—per capita calorie consumption of the flavorous foods was increasing steadily from decade to decade, and the increase in 60 years was more than in the meaty or the milky food groups though less than in the sugary or fatty. The flavorous foods being notably expensive per thousand calories and technological improvements also notable with the rise of refrigeration, canning, and freezing, the persistent rise with concurrent rise of income seems credible. Increase seems to have been shared about equally between nuts and cocoa on the one hand, all other items on the other (Chart 5). The early estimates may serve, with respect to a few specific items, to identify a decline in per capita consumption of apples which has persisted since the turn of the century; a rise in the consumption of bananas to around 1910, followed by approximate stability or slight decline; a rise in the consumption of citrus fruits continuing through 1957–59; and a rise in consumption of dried fruits up to around 1920 but not thereafter.

Official data on poundages of the fruits and vegetables consumed per capita provide illustrations of shifts of emphasis in the use of various components of the group since around 1940. The data in the following tabulation (pounds per capita per year) refer, aside from the soups and baby foods, to "farm-weight equivalent," not to processed weights (*3*, pp. 16–26; *4*, pp. 6–9):

Item	1939–41	1949–51	1957–59
All fruits	207	197	198
Citrus	70	80	83
Apples	34	30	28
Bananas	21	19	21
Other	82	68	66
All vegetables and melons	204	224	226
Tomatoes	42	51	56
Leafy, green, yellow	75	81	79
Melons	26	26	26
Other	61	66	65
Baby foods and soups (canned):			
Baby foods	1	3	5
Soups	7	10	14

These data, pointing to an increase in per capita consumption of the aggregate poundage of fruits, vegetables, and canned soups and baby foods, may appear to contradict the indication in Chart 5 of decline in consumption of calories contained in them. A partial explanation may lie in a tendency for the

fraction of items relatively low in calorie content per pound to rise while the fraction of items relatively high in calorie content per pound fell. Vegetables average lower in calorie content than fruits, and have come to make up an increased fraction of the fruit-and-vegetable total. Citrus fruits are considerably lower in calorie content per pound than apples and bananas, and it is the citrus fruits that have increased their share in total fruit consumption while the fraction of apples and bananas has declined.

Of the eight categories of fruits and vegetables covered by the tabulation, only apples and fruits other than apples, citrus, and bananas seem to have lost public favor. Bananas and melons have held their own; all other vegetables except tomatoes have shown only slight gains; tomatoes and citrus fruits have enjoyed the greatest gains in popularity. The increase in per capita consumption of canned soups and baby foods—more than twofold in less than two decades—has nearly equaled the increase in all other fruits and vegetables taken together.

The public search for convenience in household food preparation indicated by the trend toward canned soups and baby foods is evidenced also when the fruits and vegetables are classified according to their destinations for use fresh and in processed forms, as in the following tabulation (pounds per capita per year, farm-weight equivalent, *3*, pp. 21, 26; *4*, pp. 6, 9):

Item	1939–41	1949–51	1957–59
All fruits	207	197	198
Fresh	147	115	101
Dried	21	14	11
Canned (including juices)	38	54	52
Frozen	1	14	34
All vegetables and melons	204	224	226
Fresh	141	140	128
Canned	61	76	83
Frozen	2	8	15

Fresh and dried items have lost favor. The canned (including canned juices) and the frozen forms have gained greatly, rising from some 25 per cent of the total in 1939–41 to 43 per cent in 1957–59. Over the latest eight years the canned items have gained much less in consumption than the more expensive frozen ones.

Although coffee, tea, and spices are not here included with flavorous foods because their calorie content is negligible, trends of per capita consumption are of interest. Coffee consumption rose decade by decade from 7.5 pounds per person per year in 1909–11 to a peak of 14.4 pounds in 1949–51. It had declined a little to 13.3 pounds by 1957–59, probably in reflection of the increased popularity of "instant" quickly soluble coffees that require less raw material and may militate against household waste. Whether or not fewer cups or quarts of coffee are currently consumed per capita is not of record. Tea, on the other hand, has fallen in annual per capita consumption, from 1.1 pounds in 1909–11 to .6 pound around 1957–59, most of the decline occurring before 1920. Consumption of spices per capita, estimated from 1918, has stood at .8 to .9 pound except for a bulge, perhaps related to stockpiling, in 1939–41.

The official data on consumption also provide estimates since 1909 of certain nutrients contained in the consumed (not, of course, the ingested) foods. We have noted the decline in total calories per capita. From 1909–11 to 1957–59, this

decline finds reflection chiefly in the carbohydrate component, reduced from 503 to 381 grams per head per day: protein declined only from 102 to 95 grams, while fat rose from 127 to 147 grams. The mineral elements, calcium and iron, both show increases. Of the vitamins, increases are estimated in Vitamin A value, thiamine, riboflavin, and niacin, slight declines in folic acid and ascorbic acid. Some of the increases reflect additives especially in bread after 1940. Since the data do not measure ingestion and take no account of vitamins and minerals ingested in the form of pills, capsules, and powders, they suggest little about change in national nutritional status. Few would challenge, however, the probability of reduced incidence of vitamin-deficiency diseases. Alleged excesses of calorie and of saturated-fat ingestion seem today to occupy the center of the stage.

PROJECTIONS

In each decade since 1879 change of some sort has occurred in the American national diet, and, because change seems so characteristic and persistent, it appears reasonable to believe that further change will occur in the 1960's. Little can be said with assurance about the nature and extent of changes that will have been registered on completion of the three-year period centering in 1970. However, on the assumptions of absence of far-reaching revisions in the official statistics, of maintenance of wars with words rather than arms between the major powers, of continuing substantial rise in per capita income in the United States, without a severe economic recession, the opinion seems tenable that several of the trends apparent between 1950–51 and 1957–59 may continue through 1969–71.

The following tabulation, in calories per capita per day of food "consumed," summarizes the official data of 1957–59 and our quantified opinion of what similar data may show for 1969–71:

Group	1957–59		1969–71	
	Calories	Per cent	Calories	Per cent
Total	3,187	100.0	3,075	100.0
Starchy	761	23.9	620	20.2
Nonstarchy	2,426	76.1	2,455	79.8
Meaty	769	24.1	815	26.5
Sugary	525	16.5	505	16.4
Fatty	503	15.8	490	15.9
Milky	389	12.2	405	13.2
Flavorous	240	7.5	240	7.8

The major influences underlying historical reduction of total food calories consumed per capita—less arduous physical labor and fewer hours per week of it, less exposure to cold weather, conscious control of body weight, and minimization of wastes in wholesaling and retailing—seem unlikely to have spent themselves, and may well continue to outweigh wastefulness of food in households. Hence the trend of total per capita consumption of food (calories) seems likely to continue downward, perhaps at about the same rate, around 10 calories per year, as during the years from 1929–31 to 1957–59, even though such decline will necessarily cease some time in the future. We take it that total food consumed per capita per day may decline to about 3,075 calories by 1969–71.

The impact of this long-continued decline has consistently fallen upon the starchy group of foodstuffs, and curtailment of consumption of these foods has exceeded curtailment of consumption of all foods. While this tendency also

must eventually cease, little reason appears to suppose that it may not persist at least through 1969–71, though reduction may well proceed at a somewhat slower rate than in the 28 years preceding 1957–59. As since around 1930, wheat flour, the largest component of the starchy group of foods, may decline more than potatoes, corn meal, or miscellaneous grain products. Perhaps decline in the group may bring the starchy staple ratio to only slightly over 20 per cent.

If the starchy group of foods should fall more in per capita consumption than do all foods, the nonstarchy foods would rise, perhaps not much absolutely although their fraction of the total may increase from slightly over 76 per cent around 1958 to nearly 80 per cent around 1970.

Of the five nonstarchy groups of foods, the sugary has shown weakness over nearly three decades, so that slight continuing decline may be more probable than stability or increase, not large enough, however, to alter appreciably the fraction of total food calories derived from the sugary foods. The countervailing recent influences on consumption of fatty foods, with butter and lard disfavored and vegetable oils and fats favored, make it difficult even to form an opinion of probable trend in the total. But there has been little evidence of growth in the total for about three decades, and in view of nutritional persuasions against excessive intake of fats in general and animal fats in particular, a slight decline may occur, perhaps in absolute amount consumed rather than in proportional contribution. The bases for judging probable trend in consumption of the flavorous group are tenuous. We take it merely that there may be practically no change by 1969–71 in the calorie value of quantities consumed; perhaps poundages consumed will rise and the watery items continue to increase their proportional importance; the drift toward canned and especially frozen items may well continue.

The major food groups most likely to increase notably in per capita consumption appear to be the milky and the meaty. Public preference for them has been apparent in recent decades and one can sense no probability of change with incomes rising. Under our stated assumptions and barring exceptional difficulties on the side of supply, no persuasive reason appears to negate the likelihood that per capita calorie consumption of each will fall in 1969–71 close to the lines of projected trends over the past three decades. If so, both groups will have constituted higher fractions of total food consumption than at any time in nearly a century, and the meaty foodstuffs will definitively have displaced the starchy foods as the leading source of national food calories available at retail level or purchased; whether or not of calories ingested remains conjectural.

CITATIONS

1 U.S. Dept. Agr., Bur. Agr. Econ., *Consumption of Food in the United States, 1909–48* (Misc. Pub. 691, August 1949).

2 ———, *Consumption of Food in the United States, 1909–52* (Agr. Hdbk. 62, September 1953).

3 U.S. Dept. Agr., Agr. Mktg. Serv., *Supplement for 1956 to Consumption of Food in the United States, 1909–52* (Agr. Hdbk. 62, September 1957).

4 ———, *Supplement for 1959 to Consumption of Food in the United States, 1909–52* (Agr. Hdbk. 62, August 1960).

5 U.S. Dept. Comm., Bur. Census, *Historical Statistics of the United States, Colonial Times to 1957* (Statistical Abstract Supplement, 1960).

6 Survey of Current Business (U.S. Dept. Comm., Off. Bus. Econ.), July 1960.

Also see ed Stat Bull 364 June 1965 - re total lbs treated in Ag Tabs 1 + 11

CONSUMPTION OF FOOD IN THE UNITED STATES, ANNUALLY IN THREE-YEAR PERIODS CENTERING IN SPECIFIED YEARS, 1879–1959

TABLE I.—POUNDS PER CAPITA PER YEAR*

Item	Approximate trend values			Official estimates of 1960					
	1879	1889	1899	1910	1920	1930	1940	1950	1958
1. Wheat flour[a]	224.8	224.8	224.8	215.0	179.0	172.0	156.0	135.0	119.0
2. Sugar[b]	39.8	53.8	63.1	75.5	86.5	102.3	100.3	96.8	97.6
3. Corn meal and flour	146.0	106.0	94.0	51.2	35.0	28.5	21.4	11.8	7.7
4. White potatoes[c]	157.0	165.0	167.0	181.3	148.2	138.4	122.6	106.3	97.6
5. Minor grain products[d]	29.3	29.3	29.3	29.3	29.2	29.4	21.9	20.8	20.7
6. Shortening, edible oils[e]	5.0	6.5	8.0	9.5	11.0	15.2	17.6	18.0	22.2
7. Dry beans, peas (cleaned)[f]	13.0	13.0	13.0	13.0	9.8	12.2	12.7	11.0	9.3[f]
8. Sirups[g]	13.3	13.3	13.3	13.3	18.2	13.0	13.3	12.6	11.9
9. Apples (fresh)	75.0	78.0	80.0	58.6	43.3	40.0	41.9	30.7	22.8
10. Sweet potatoes[h]	27.0	26.0	22.0	23.3	25.8	18.4	16.1	9.7	6.5
11. Peanuts (shelled)	.3	.5	1.4	2.4	3.4	3.9	4.7	4.4	4.5
12. Bananas	3.0	7.5	12.5	20.0	17.2	22.1	19.0	17.8	19.5
13. Dried fruits[i]	1.0	1.1	1.3	4.0	6.4	5.1	5.6	4.0	3.2
14. Margarine	.2	.5	1.0	1.3	2.9	2.5	2.5	6.2	8.9
15. Tree nuts (shelled), cocoa[j]	.6	.8	1.0	1.8	3.8	4.0	5.6	5.6	5.1
16. Tomatoes[k]	42.8	42.8	42.8	42.8	39.5	41.3	46.3	46.2	45.3
17. Peaches (fresh)	13.9	13.9	13.9	13.9	11.9	13.3	14.0	8.5	8.5
18. Onions[l]	12.0	11.7	11.3	11.0	11.0	10.2	10.1	9.7	9.3
19. Melons[m]	39.0	39.0	39.0	39.0	41.4	41.2	35.6	23.3	28.5
20. Oranges (fresh)	4.0	5.0	6.4	13.2	17.3	23.7	37.8	27.4	18.9
21. Corn sugar	.5	.7	.9	1.1	.7	5.8	3.3	4.2	3.6
22. Cabbage	22.0	21.0	20.0	18.7	17.9	16.6	14.5	12.0	9.5
23. Whole milk[n]	260.0	265.0	270.0	256.2	276.3	272.7	269.3	301.0	305.2
24. Butter	15.2	18.2	19.8	18.2	15.5	17.8	16.8	10.3	8.3
25. Lean pork[o]	50.0	48.0	46.7	43.0	41.6	44.4	44.8	45.2	41.3
26. Bacon and saltside[o]	23.0	20.5	20.1	18.5	18.0	19.2	19.3	19.5	17.8
27. Beef[o]	56.0	58.0	53.0	56.1	46.4	38.8	44.9	48.3	65.0
28. Lard	13.2	13.1	13.0	12.4	11.2	13.0	13.6	12.2	9.4
29. Eggs	25.0	29.0	36.0	37.5	36.5	40.4	38.1	48.4	44.5
30. Nonfat fluid milks[p]	107.0	100.0	93.0	87.5	75.6	66.4	65.0	57.0	55.0[p]
31. Fowl (eviscerated)[q]	15.0	16.0	17.0	17.8	16.1	16.8	17.8	25.0	33.8

Item	Approximate trend values			Official estimates of 1960					
	1879	1889	1899	1910	1920	1930	1940	1950	1958
32. Cream[r]	10.7	10.7	10.7	10.7	12.8	13.4	13.8	13.5	12.5
33. Offals and game[d]	16.0	15.0	14.0	13.5	12.7	10.6	11.4	12.5	12.9
34. Fish[t]	13.0	12.7	12.5	12.5	12.6	11.6	12.1	12.3	11.7
35. Cheese[u]	3.0	4.0	4.2	4.6	4.7	5.8	7.8	10.9	13.1
36. Lamb and mutton	7.0	6.4	5.8	6.1	5.1	5.8	6.0	3.4	3.8
37. Veal	6.0	6.0	4.7	6.6	7.1	5.8	6.8	7.1	6.4
38. Condensed and evaporated milk[v]	.3	.7	2.5	5.9	9.4	13.5	18.5	19.4	14.9
39. Miscellaneous milk products[w]	.0	.0	.0	.7	1.8	4.3	7.0	12.2	16.4
40. Residual[x]	125	135	145	158	175	200	227	233	223
Total[y]	1,615	1,619	1,634	1,605 1,580	1,538 1,519	1,559 1,546	1,563 1,544	1,513 1,490	1,475 1,442
Subtotals:									
Vegetable foods[z]	995	995	1,011	997	935	959	950	855	803
Animal foods[aa]	620	624	623	608	604	600	613	658	672

[a] Data for 1909 and following computed from U.S. Dept. Agr., Bur. Agr. Econ., *Consumption of Food in the United States, 1909–52* (Agr. Hdbk. 62, September 1953), as revised and continued by Agr. Mktg. Serv. in its *Supplement for 1956 . . .* (September 1957), and *ibid., 1959* (August 1960). Data for earlier years are the authors' estimates, which are described in a supplement available on request.

[b] Includes semolina and whole-wheat flour.

[c] Refined cane and beet; includes quantities used in canning.

[d] Includes quantities from farm and nonfarm home gardens.

[e] Wheat cereal, rye flour, buckwheat flour, milled rice, corn cereal, cornstarch, hominy and grits, oat food products (mainly oatmeal), and barley products (meal, pearl barley, malt not for brewing).

[f] Of vegetable origin chiefly.

[g] Includes soya grits (1957 only in 1957–59), and beans and peas from home gardens.

[h] Includes cane, corn, sorgo, maple, and refiners sirups, edible cane molasses, and honey.

[i] Includes home-garden production and quantities canned.

[j] Mainly prunes and raisins.

[k] Chocolate-liquor equivalent of cocoa beans.

[l] Includes canned tomato products, commercial fresh, and home-grown production.

[m] Mature onions, and shallots; commercial; 1910 authors' estimate.

[n] Includes home-garden production.

[o] Quantity consumed as fluid milk and amount used in ice cream.

[p] Not including offals.

[q] Skim milk consumed as such, skim milk in chocolate drinks, cultured and natural buttermilk; 1957–59 approximate (in process of official revision).

[r] Chickens, turkeys, ducks, geese.

[s] Consumed as such and used in ice cream.

[t] Livers, kidneys, hearts, tongues, brains, tripes of slaughtered animals; game birds and mammals and domesticated rabbits.

[u] Fresh, frozen, canned, and cured, in terms of edible weight, plus game fish.

[v] Includes cottage cheese.

[w] Condensed whole milk sweetened and unsweetened; evaporated whole milk.

[x] Mainly dried, evaporated, and condensed skim milk, but also includes other manufactured milk products not included elsewhere.

[y] For 1910 and following computed as a difference between the total and the sum of the 39 listed items; rough approximations for earlier years. Consists of miscellaneous fruits and vegetables, and canned soups and baby foods.

[z] For 1910 and following official total (for Table I less coffee and tea which have no calorie value). For earlier years the sum of Series 1–39 plus the approximation for Series 40.

[aa] Sum of Series 1–22, and 40.

[bb] Sum of Series 23–39.

CONSUMPTION OF FOOD IN THE UNITED STATES, ANNUALLY IN THREE-YEAR PERIODS CENTERING IN SPECIFIED YEARS, 1879–1959

TABLE II.—CALORIES PER CAPITA PER DAY*

Item	Calories per pound	Approximate trend values			Official estimates of 1960					
		1879	1889	1899	1910	1920	1930	1940	1950	1958
1. Wheat flour[a]	1,654	1,019	1,019	1,019	974	811	779	707	612	539
2. Sugar[b]	1,748	191	258	302	362	414	490	480	464	467
3. Corn meal and flour	1,630[ab]	652	473	420	229	156	127	96	53	34
4. White potatoes[c]	318	137	144	145	158	129	121	107	93	85
5. Minor grain products[d]	1,650	132	132	132	132	132	133	99	94	94
6. Shortening, edible oils[e]	4,013	55	71	88	104	121	167	194	198	244
7. Dry beans, peas (cleaned)[f]	1,537	55	55	55	55	41	51	53	46	39[r]
8. Sirups[g]	1,300	47	47	47	47	65	46	47	45	42
9. Apples (fresh)	232	48	50	51	37	28	25	27	20	14
10. Sweet potatoes[h]	480	36	34	29	31	34	24	21	13	9
11. Peanuts (shelled)	2,540	2	3	10	17	24	27	33	31	31
12. Bananas	269	2	6	9	15	13	16	14	13	14
13. Dried fruits[i]	1,150	3	3	4	13	20	16	18	13	10
14. Margarine	3,269	2	4	9	12	26	22	22	56	80
15. Tree nuts (shelled), cocoa[j]	2,800[ac]	5	6	7	12	26	28	38	38	36
16. Tomatoes[k]	81	9	9	9	9	9	9	10	10	10
17. Peaches (fresh)	183	7	7	7	7	6	7	7	4	4
18. Onions[l]	193	6	6	6	6	6	5	5	5	5
19. Melons[m]	50	5	5	5	5	6	6	5	3	4
20. Oranges (fresh)	147	2	2	3	5	7	10	15	11	8
21. Corn sugar	1,583	2	3	4	5	3	25	14	18	16
22. Cabbage	80	5	5	4	4	4	4	3	3	2
23. Whole milk[n]	309	220	224	229	217	234	231	228	255	258
24. Butter	3,251	135	162	176	162	138	159	150	92	74
25. Lean pork[o]	1,346[ab]	184	177	172	159	153	164	165	167	152
26. Bacon and saltside[o]	2,998[ab]	189	168	165	152	148	158	159	160	146
27. Beef[o]	919[ab]	141	146	133	141	117	98	113	122	164
28. Lard	4,095	148	147	146	139	126	146	153	137	105
29. Eggs	655	45	52	65	67	65	72	68	87	80
30. Nonfat fluid milks[p]	162	47	44	41	39	34	29	29	25	24
31. Fowl (eviscerated)[q]	713	29	31	33	35	31	33	35	49	66

Item	Calories per pound	Approximate trend values 1879	1889	1899	Official estimates of 1960 1910	1920	1930	1940	1950	1958
32. Cream[r]	1,116[ab]	33	33	33	33	39	41	42	41	38
33. Offals and game[s]	678[ab]	30	28	26	25	24	20	21	23	24
34. Fish[t]	650	23	23	22	22	22	21	22	22	21
35. Cheese[u]	1,500	12	16	17	19	19	24	32	45	54
36. Lamb and mutton	1,070[ab]	21	19	17	18	15	17	18	10	11
37. Veal	681	11	11	9	12	13	11	13	13	12
38. Condensed and evaporated milk[v]	625	1	1	4	10	16	23	32	33	26
39. Miscellaneous milk products[w]	...[ac]	0	0	0	1	3	11	18	31	43
40. Residual[x]	...	50	55	60	63	72	91	94	92	102
Total[y]	...	3,741	3,679	3,713	3,553	3,350	3,487	3,407	3,247	3,187
Subtotals:										
Vegetable foods[z]	...	2,472	2,397	2,425	2,302	2,153	2,229	2,109	1,935	1,889
Animal foods[aa]	...	1,269	1,282	1,288	1,251	1,197	1,258	1,298	1,312	1,298
Starchy foods[ae]	...	1,976	1,802	1,745	1,524	1,262	1,184	1,030	865	761
Meaty foods[af]	...	740	726	714	705	648	669	699	744	769
Fatty foods[ag]	...	340	384	419	417	411	494	519	483	503
Milky foods[ah]	...	301	302	307	300	326	335	349	385	389
Sugary foods[ai]	...	240	308	353	414	482	561	541	527	525
Flavorous foods[aj]	...	144	157	175	193	221	244	269	243	240

[*] Calories per pound from, or approximated from, Bernice K. Watt and Annabel L. Merrill, *et al., Composition of Foods—Raw, Processed, Prepared* (U.S. Dept. Agr., Agr. Hdbk. 8, June 1950), except as noted [ab]. Calories per capita computed from Table I, except residual (Series 40). Series numbered in order of magnitude around 1910, for vegetable foods and animal foods separately.

[a–ae] See Table I.

[ab] Supplied by the United States Department of Agriculture.

[ac] For tree nuts; chocolate-liquor equivalent of cocoa beans converted separately at 2,275.

[ad] Rates for individual products used for conversion to calories.

[ae] Sum of Series 1, 3, 4, 5, 10.

[af] Sum of Series 7, 25–27, 29, 31, 33–37.

[ag] Sum of Series 6, 14, 24, 28.

[ah] Sum of Series 23, 30, 32, 38–39.

[ai] Sum of Series 2, 8, 21.

[aj] Sum of Series 9, 11–13, 15–20, 22, 40.

CONSUMPTION OF FOOD IN THE UNITED STATES, ANNUALLY IN THREE-YEAR PERIODS CENTERING IN SPECIFIED YEARS, 1879–1959

TABLE III.—PER CENT OF TOTAL CALORIES PER CAPITA PER DAY*

Item	Approximate trend values			Official estimates of 1960					
	1879	1889	1899	1910	1920	1930	1940	1950	1958
1. Wheat flour[a]	27.2	27.7	27.4	27.4	24.2	22.3	20.8	18.8	16.9
2. Sugar[b]	5.1	7.0	8.1	10.2	12.4	14.1	14.1	14.3	14.1
3. Corn meal and flour	17.4	12.9	11.3	6.4	4.7	3.6	2.8	1.6	1.1
4. White potatoes[c]	3.7	3.9	3.9	4.4	3.9	3.5	3.1	2.9	2.7
5. Minor grain products[d]	3.5	3.6	3.6	3.7	3.9	3.8	2.9	2.9	2.9
6. Shortening, edible oils[e]	1.5	1.9	2.4	2.9	3.6	4.8	5.7	6.1	7.7
7. Dry beans, peas (cleaned)[f]	1.5	1.5	1.5	1.5	1.2	1.5	1.6	1.4	1.2
8. Sirups[g]	1.3	1.3	1.3	1.3	1.9	1.3	1.4	1.4	1.3
9. Apples (fresh)	1.3	1.4	1.4	1.0	.8	.7	.8	.6	.4
10. Sweet potatoes[h]	1.0	.9	.8	.9	1.0	.7	.6	.4	.3
11. Peanuts (shelled)	.0[ab]	.1	.3	.5	.7	.8	1.0	1.0	1.0
12. Bananas	.0[ab]	.2	.2	.4	.4	.5	.4	.4	.4
13. Dried fruits[i]	.1	.1	.1	.4	.6	.5	.5	.4	.3
14. Margarine	.0[ab]	.1	.2	.3	.8	.6	.6	1.7	2.5
15. Tree nuts (shelled), cocoa[j]	.1	.2	.2	.3	.8	.8	1.1	1.2	1.1
16. Tomatoes[k]	.2	.2	.2	.3	.3	.3	.3	.3	.3
17. Peaches (fresh)	.2	.2	.2	.2	.2	.2	.2	.1	.1
18. Onions[l]	.2	.2	.2	.2	.2	.1	.1	.2	.2
19. Melons[m]	.1	.1	.1	.1	.2	.2	.1	.1	.1
20. Oranges (fresh)	.0[ab]	.0[ab]	.1	.1	.2	.3	.4	.3	.3
21. Corn sugar	.0[ab]	.1	.1	.1	.1	.7	.4	.6	.5
22. Cabbage	.1	.1	.1	.1	.1	.1	.1	.1	.1
23. Whole milk[n]	5.9	6.1	6.2	6.1	7.0	6.6	6.7	7.9	8.1
24. Butter	3.6	4.4	4.7	4.6	4.1	4.6	4.4	2.8	2.3
25. Lean pork[o]	4.9	4.8	4.6	4.5	4.6	4.7	4.8	5.1	4.8
26. Bacon and saltside[o]	5.1	4.6	4.4	4.3	4.4	4.5	4.7	4.9	4.6
27. Beef[o]	3.8	4.0	3.6	4.0	3.5	2.8	3.3	3.8	5.1
28. Lard	4.0	4.0	3.9	3.9	3.8	4.2	4.5	4.2	3.3
29. Eggs	1.2	1.4	1.8	1.9	1.9	2.1	2.0	2.7	2.5
30. Nonfat fluid milks[p]	1.3	1.2	1.1	1.1	1.0	.8	.9	.8	.8
31. Fowl (eviscerated)[q]	.8	.8	.9	1.0	.9	.9	1.0	1.5	2.1

Item	Approximate trend values			Official estimates of 1960					
	1879	1889	1899	1910	1920	1930	1940	1950	1958
32. Cream[r]	.9	.9	.9	.9	1.2	1.2	1.2	1.3	1.2
33. Offals and game[s]	.8	.8	.7	.7	.7	.6	.6	.7	.8
34. Fish[t]	.6	.6	.6	.6	.7	.6	.6	.7	.7
35. Cheese[u]	.3	.4	.5	.5	.6	.7	.9	1.4	1.7
36. Lamb and mutton	.6	.5	.5	.5	.4	.5	.5	.3	.3
37. Veal	.3	.3	.2	.3	.4	.3	.4	.4	.4
38. Condensed and evaporated milk[v]	.0	.0	.1	.3	.5	.7	.9	1.0	.8
39. Miscellaneous milk products[w]	.0	.0	.0	.0	.1	.3	.5	1.0	1.3
40. Residual[x]	1.3	1.5	1.6	1.8	2.1	2.6	2.8	2.8	3.2
Total[y]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Subtotals:									
Vegetable foods[z]	66.1	65.2	65.3	64.8	64.3	63.9	61.9	59.6	59.3
Animal foods[aa]	33.9	34.8	34.7	35.2	35.7	36.1	38.1	40.4	40.7
Starchy foods[ac]	52.8	49.0	47.0	42.9	37.7	34.0	30.2	26.6	23.9
Meaty foods[ad]	19.8	19.7	19.2	19.9	19.3	19.2	20.5	22.9	24.1
Fatty foods[ae]	9.1	10.4	11.3	11.7	12.3	14.1	15.2	14.9	15.8
Milky foods[ah]	8.0	8.2	8.3	8.4	9.7	9.6	10.3	11.9	12.2
Sugary foods[ai]	6.4	8.4	9.5	11.7	14.4	16.1	15.9	16.2	16.5
Flavorous foods[aj]	3.9	4.3	4.7	5.4	6.6	7.0	7.9	7.5	7.5

[*] Computed from Table II. Due to rounding, the totals and subtotals above, computed from the corresponding totals in Table II, are not necessarily the sum of the individual items.

[r–aa] See Table I.
[ab–aj] See Table II.
[ak] Unrounded .05.

Thomas T. Poleman

THE FOOD ECONOMIES OF URBAN MIDDLE AFRICA: THE CASE OF GHANA*

One of the most striking features in the recent course of Middle African development has been the growth of urban centers. Encouraged by great improvements in communications, enlarged investment, and the increasingly commercialized character of African life, many cities here have doubled, tripled, or even quadrupled in size since World War II. This is not to suggest that Middle Africa is as yet anything like an urbanized region. At midcentury this vast area was thought to contain only 108 cities with populations in excess of 20,000, and these centers together accounted for only about five per cent of the region's 122 million people (6, pp. 131–32, Map 41, Table D). But, as a comparison of the prewar and postwar population estimates given in Table 1 makes clear, a strong movement of people to the cities is definitely under way, and it is accelerating rapidly.

Urbanization within the African milieu poses a multitude of problems, not the least of which relates to food supplies. African food farming is still an extremely primitive operation. Until very recently excluded from the assistance programs of most governments, it has changed but slightly with time. The hoe persists as the principal implement, and shifting cultivation is still almost exclusively relied upon for fertility maintenance. To such a system, obviously, a growing population of town dwellers presents a major challenge. Not only will the needs of an increasing number of nonself-suppliers have to be met by a re-

* The present study is one of several prepared under the sponsorship of the Human Environments in Middle Africa project of the National Academy of Sciences—National Research Council. Following the definition agreed upon by the senior staff of that project, "Middle Africa" is taken here to mean that portion of the continent which has as its southern limit the southern boundaries of Tanganyika and the Congo (excluding Katanga) and which extends north to include Ethiopia, the Sudan, and all of the former French West African territories save Mauritania. So defined, it refers to that portion of tropical Africa which is still primarily agricultural, most of the countries or regions with major mining or industrial sectors having been excluded.

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TABLE 1.—MIDDLE AFRICA: PREWAR AND POSTWAR POPULATION OF SELECTED CITIES*

(*Thousand persons*)

City	Territory	Prewar[a]	Postwar[a]
Abidjan	Ivory Coast	10 (1931)	128 (1955)
Addis-Ababa	Ethiopia	150 (1939)	400 (1952)
Bangui	Ubangi-Shari	14 (1937)	85 (1957)
Brazzaville	Middle Congo	40 (1937)	99 (1957)
Dakar	Senegal	93 (1936)	231 (1955)
Dar-es-Salaam	Tanganyika	33 (1931)	99 (1952)
Freetown	Sierra Leone	55 (1931)	77 (1956)
Ibadan	Nigeria	387 (1931)	459 (1952)
Kano	Nigeria	89 (1931)	130 (1952)
Khartoum	Sudan	45 (1938)	93 (1956)
Lagos	Nigeria	126 (1931)	312 (1956)
Leopoldville	Belgian Congo	36 (1938)	300 (1955)
Monrovia	Liberia	10 (1938)	41 (1956)

* Data for postwar years from United Nations (UN), Dept. Econ. and Soc. Aff., *Demographic Yearbook, 1957* (1957), pp. 150–51, except for Bangui for which estimate is from French Equatorial Africa, High Commis., *L'A.E.F. Economique et Sociale 1947–1958* (Brazzaville, 1959), p. 8. Prewar data from Walter Yust, ed., *Encyclopaedia Britannica World Atlas* (prepared by G. D. Hudson, Chicago, 1942), pp. 182–211, except for Abidjan which is from B. F. Johnston, *The Staple Food Economies of Western Tropical Africa* (Stanford, Calif., 1958), p. 5. As most African population estimates are notoriously unreliable, the foregoing statistics must be accepted only with reservation.

[a] Figures in parentheses are the year of census or estimate.

duced number of growers, and the means adapted through which foodstuffs may be moved considerable distances at reasonable costs: at the same time per capita demand will in all likelihood increase. One of the familiar features of economic development is a change in dietary patterns (*3*, pp. 224–25). As income levels in the cities rise, more and more people will be able to afford foodstuffs in greater quantities and of a "preferred," more expensive type.

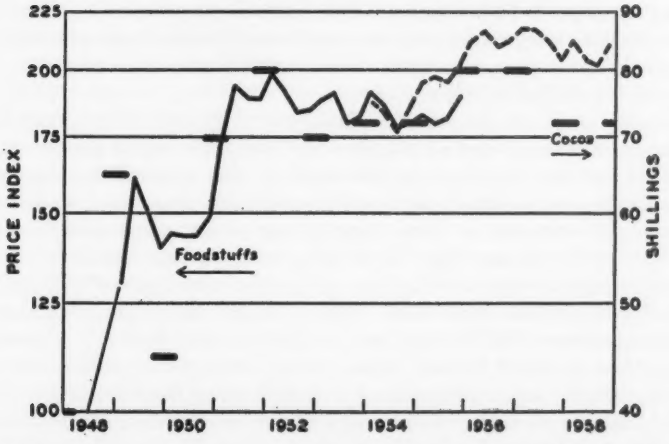
Whether this challenge can be met without sizable imports from more advanced regions is a much debated question. Though several closely documented studies have recently suggested that African agriculture is much more viable than it was once thought to be (cf. *27, 28*), the consensus remains none too optimistic. Indeed, the postwar period has witnessed a rash of almost panicky "Grow-More-Food" campaigns and price-fixing schemes intended to stimulate production.

As an example of this general feeling of apprehension, one may cite the reaction to a series of sharp increases in urban food prices which occurred about a decade ago in Ghana,[1] the country with which we shall be concerned here. Though at least partially cognizant of the special circumstances which underlay these rises, one party of visiting economists interpreted them as clear evidence that "the production of food for market has not increased fast enough to meet the enormous increases in demand associated with growing population, rising

[1] Though Ghana did not become an independent state and adopt that name until March 1957, I shall not labor the point by calling it the Gold Coast in references to the period when it was actually so designated.

CHART 1.—GHANA: INDEX OF RETAIL PRICES OF LOCALLY PRODUCED FOODSTUFFS IN SEVEN CITIES, AND PRODUCER PRICE OF COCOA, 1948–1958*

(Av. 1948 = 100; shillings per 60-lb. load; logarithmic vertical scale)



* Retail price index is a composite of indices for Accra, Kumasi, Sekondi-Takoradi, Tarkwa, Tamale, Keta, and Ho weighted according to their populations in 1948. In 1954 a new index using a revised market basket was begun with that year as the base period; here it has been related to the older one using 1954 as the year of comparison. Quarterly data for 1949–51 from Dudley Seers and C. R. Ross, *Report on Financial and Physical Problems of Development in the Gold Coast* (Accra, 1952), p. 23; for 1952 from Gold Coast, Min. Fin., *Economic Survey, 1953* (1954), p. 19; for 1953–58 from Gold Coast (or Ghana), Off. Govt. Stat., (*Quarterly*) *Digest of Statistics* (various issues).

Cocoa prices are fixed prices paid by the Cocoa Marketing Board for a 60-lb. load of Grade I and II dry beans at collecting stations during the September–March primary crop buying season. 1947/48–1954/55 prices from Gold Coast, Dept. Agr., *Annual Report . . .* (various issues); 1955/56–1958/59 prices from Ghana, Min. Fin., *Economic Survey* (various issues).

money incomes and the rapid growth in the number of people working in the towns" (*38*, p. 23).

Food prices in Ghana are closely related to the price paid producers for cocoa. This relationship, illustrated graphically in Chart 1, exists for several reasons, the most important being the dominant role cocoa plays in the economy.[2] Regularly accounting for over two-thirds of the country's exports, it is by far the most important source of Ghana's wealth. If cocoa prices are high there is prosperity, if they are low, depression; and the prices of other items, foodstuffs included, respond accordingly. Indeed, it is reported that in many parts of the country the cocoa price is used directly as a yardstick, other prices being adjusted immediately following announcement of the price to be paid by the Cocoa Marketing Board (*38*, p. 23). Thus it was in 1948/49, albeit to an unprecedented extent. In that year the Board announced that the price to producers would be increased from

[2] Involved also is the fact that, unlike their Nigerian opposite numbers, a majority of Ghana's cocoa farmers grow most of their own food (*27*, p. 16). In years when cocoa prices are particularly favorable, however, they tend to slight their food plots, preferring instead to buy for cash—thereby both heightening demand and reducing supplies. This happened in both 1948/49 and 1950/51 (*38*, pp. 21–25).

40 shillings per 60-pound load to 65 shillings. Food prices quickly followed suit, rising according to the newly devised urban food price index by 45 per cent during the year. Although the following season witnessed a slight decline—the cocoa price having been reduced to 45 shillings—the same chain of events was repeated in 1950/51. Following an increase in the cocoa price to 70 shillings (the effects of which were reinforced by an attack of rust which severely damaged the maize crop) food prices rose again, this time climbing to a level almost double that which prevailed in 1948.

Coming so quickly in succession, these two steep rises in the prices urban consumers were compelled to pay for their foodstuffs created a great deal of official as well as private anxiety, particularly as they occurred at a time when the authorities were already faced with considerable civil unrest in the cities. Especially alarmed was the Department of Agriculture, which voiced in its report for 1949/50 the fear "that if something were not done the country would be faced with a chronic food shortage and greatly inflated prices" (*15*, p. 3).

Such extreme fears would seem to have been at least temporarily allayed by the situation since 1950/51. As Chart 1 indicates, urban food prices have been reasonably stable (save for one general rise following an increase in the cocoa price in 1955/56), while the Department of Agriculture has repeatedly expressed its satisfaction with the over-all level of food production (cf. *11*, p. 3). Nonetheless, gloomy inferences continue to be drawn from the experiences of 1948/49 and 1950/51. Writing in 1954, for instance, F. J. Pedler remarked on the wide seasonal variations in the prices individual foodstuffs commanded in Ghana's cities in 1950/51 (*35*, p. 51), noting among others the following (in shillings per hundredweight):

Foodstuff	Accra			Kumasi			Sekondi-Takoradi		
	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.
Maize	81	26	50	62	25	43	89	27	54
Rice	89	72	82	84	72	80	95	76	86
Yams	50	32	40	36	19	27	—	—	—
Manioc	22	9	15	8	4	6	10	6	7
Cocoyams	37	23	31	23	13	19	31	21	25

Such sharp variations, he concluded, could only be "an indication that too little food is produced to meet the needs of the people through the year. Traders know this, and they buy food at harvest time to hold it until prices rise. They are often blamed for high prices and scarcity, but their action is the result of shortage, not the cause of it" (*35*, p. 51).

It is difficult either to defend or refute reasoning such as this with certainty. In many respects Africa is still the Dark Continent; the economist, particularly, is confronted with an extreme paucity of evidence on which to apply the tools of his trade. About the price elasticity of food production, so vital to the long-run question of urban provisionment, for instance, next to nothing is known; and so it is throughout most of the economic spectrum. Given such a situation, manifestly, the first steps forward must hinge not on unsupported though incisive opinion, but rather on exploratory descriptive outlines. It was with this in mind that the present study was undertaken. How wide an area do African

cities presently draw on for their food supplies? What is the make-up of urban diets? And what changes in consumption patterns occur seasonally and with rises in income? Light must be shed on these and related questions before reasoned attempts are made to see into the future.

The choice of Ghana for detailed study warrants explanation. Inquiries into the economics of Middle Africa have typically been of two general types: macrostudies dealing with a particular economic problem on a continental basis, and microstudies examining economic phenomena in so far as they bear on the social structure of a particular tribe or people. The present inquiry was originally conceived as being of the first type. A thorough review of the available evidence soon suggested, however, that the time was not yet ripe. Although food-consumption sample surveys are now available for a sizable number of urban centers,[3] complementary evidence on the supply side remains excessively sketchy. Apart from Ghana, the only country for which any reasonably complete picture of supply characteristics can be built up is Nigeria, and here one is obliged to depend chiefly on railroad statistics, which throw light only on long-distance movements. Favoring Ghana, moreover, was the number of consumption surveys available for its cities. Surveys of this type, and by African standards good ones, have been carried out in all three of its principal cities, a situation equaled elsewhere in Middle Africa only in Senegal and Uganda.

The study falls into three main sections. The food-consumption characteristics of Ghana's urban dwellers form the subject matter of the second of these; the supply side is taken up in the third. Preceding them is a brief description of Ghana, its agricultural resources, and its chief cities.

GHANA

Economically, Ghana ranks among the more advanced countries of Middle Africa; in fact, it is probably the most advanced if territories with substantial European settlement are excluded from consideration. Far and away the world's largest producer and exporter of cocoa (a position held since 1913), it is also the home of a major mining industry. Gold has been mined by European concerns for over 80 years, while more recently the country has become one of the principal suppliers of industrial diamonds and manganese. All this has made for a relatively high level of investment, both private and public, and a fairly high level of living. The stock of overhead capital facilities, such as railways and roads, is among the most complete on the continent, while, according to estimates published by the United Nations, gross output per capita (the equivalent of $194 [U.S.] in 1957) is exceeded in subsaharan Africa only in the Union of South Africa (*42*, p. 15).

This is not to say, of course, that Ghana has as yet passed beyond the first stages on the path to sustained economic growth. Despite impressive gains in the extractive and mercantile sectors, the economy remains predominantly agricultural. In 1948, the most recent year for which complete census statistics are available, almost three-quarters of the adult male population still depended di-

[3] Namely: Abidjan, Accra, Dakar, Dar-es-Salaam, Enugu, Freetown, Ibadan, Jinja, Kaduna, Kampala, Kumasi, Lagos, Leopoldville, Nairobi, Saint-Louis, Sekondi-Takoradi, Thies, and Zaria.

rectly and exclusively on farming for its livelihood (*18*, p. 370). Moreover, a substantial fraction of the peasantry is still made up of subsistence growers participating little, if at all, in the national economy. Development and underdevelopment are relative things. Although in the forefront as far as tropical Africa is concerned, Ghana's economy is nonetheless primitive indeed.

Agricultural Resources[4]

Like Caesar's Gaul, Ghana is divided into three parts—three major and sharply contrasting natural regions which reflect in turn differences in vegetation and in climate (Map 1). They are the Northern Savanna, the Forest, and the Coastal Savanna. Of these, the largest by far is the Northern Savanna, comprising about two-thirds of the country's area. Rainfall here is relatively low—averaging almost everywhere less than 50 inches—and is restricted to one clearly defined rainy season (March–October). During the remaining four months of the year the hot, desiccating harmattan winds from the northeast prevail, and the region turns exceedingly dry. As a consequence of this brief but intense aridity, the natural cover is typically a more or less continuous carpet of short grasses with occasional stunted trees intermixed.

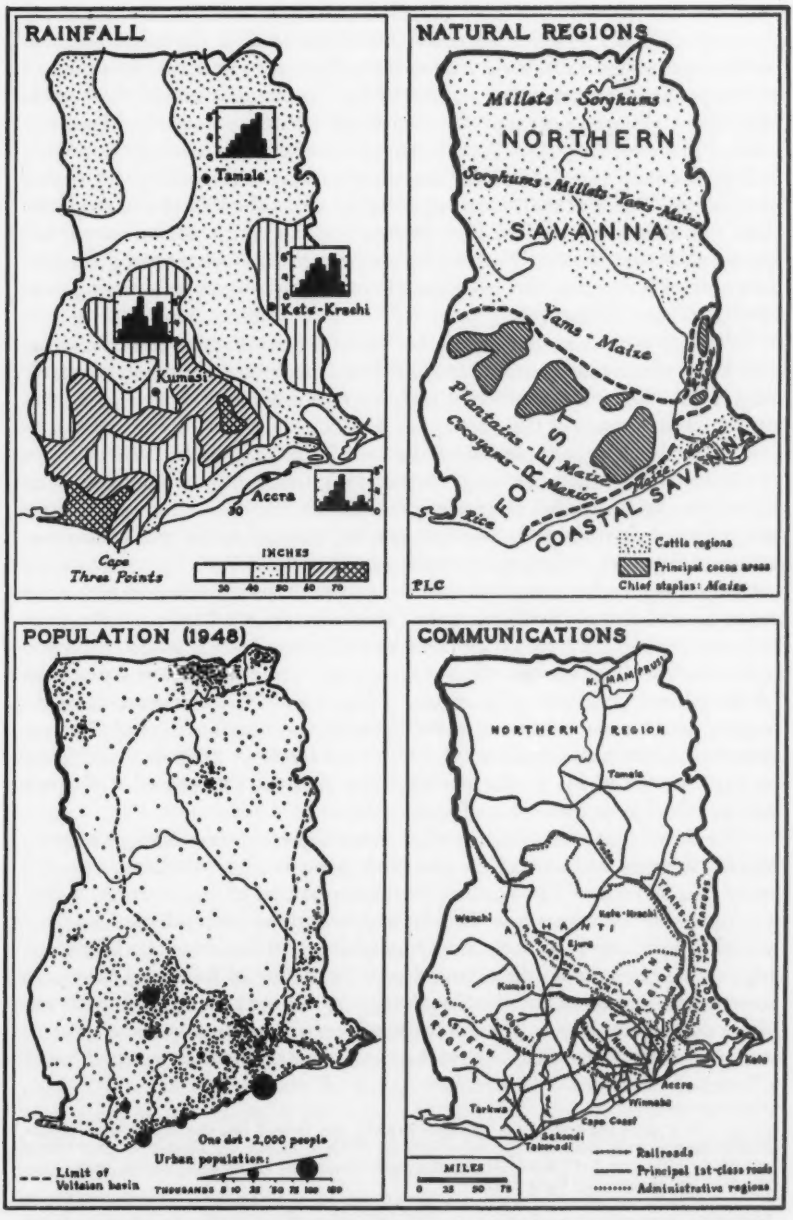
The Northern Savanna is the least advanced section of Ghana. It is also the least densely populated; with something like 1.8 million inhabitants (according to provisional findings of the 1960 census), the zone contains only slightly over a quarter of the country's 6.7 million people (*13*, p. 1). This low density primarily mirrors a poverty of soil resources. Most of the area falls within the Voltaian Basin, a rather featureless depression underlaid by porous sandstone. The soils derived from this material are generally shallow and infertile and have little moisture-retaining capacity. During the harmattan season they tend to dry out rapidly and form a hardpan, whereas during the rainy period they are subject to heavy surface runoff. It is in the area of these soils that population densities are the lowest, averaging for the most part less than 15 persons per square mile. Only in the peripheral plateau sections of the Northern Savanna, where soils of granitic origin prevail, are densities comparable to those found to the south. The extreme example is the northern portion of Mamprusi District. Here are concentrated almost half the inhabitants of the Northern Region,[5] the density in places exceeding 200 per square mile.

[4] In writing this section I have relied heavily on the two recent geographies of Ghana: W. J. Varley and H. P. White, *The Geography of Ghana* (London, 1958); and E. A. Boateng, *A Geography of Ghana* (Cambridge, 1959).

[5] So many changes have taken place in the last several years with respect to the names and boundaries of Ghana's administrative regions that it is necessary that the various ones recognized in this article be clearly identified. Under British rule the Gold Coast was originally made up of three divisions: the Gold Coast Colony, Ashanti, and the Northern Territories. Following the first World War Togoland was added as a League of Nations mandate, the southern portion being administered through the Colony, the northern section through the Northern Territories. Except for the formation of Trans-Volta/Togoland in 1952, this structure remained unchanged until the country received its independence in March 1957. Under the new constitution five regions were recognized: the Northern Region (the Northern Territories plus the northern half of Togoland); Ashanti (retaining its former boundaries); the Western Region (the western half of the Colony); the Eastern Region (the eastern portion of the Colony save that part which lay east of the Volta); and the Trans-Volta/Togoland Region (southern Togoland plus the section of the Colony east of the Volta). The limits of these five regions were as shown in Map 1.

This structure lasted only two years. By the end of 1958 the constitution of 1957 had been heavily amended and the Government's "federalist" opponents almost completely silenced. In April 1959 the northern and western portions of Ashanti, their former stronghold, were detached (to-

MAP 1.—GHANA: PRINCIPAL FEATURES*



* Rainfall, natural regions, and communications adapted from E. A. Boateng, *A Geography of Ghana* (Cambridge, 1959), pp. 33, 34, 63, 119; population distribution after W. J. Varley and H. P. White, *The Geography of Ghana* (London, 1958), p. 274.

Agriculture in the Northern Savanna is characterized by the rearing of livestock and the cultivation of those annual crops which can either mature before the onset of the dry season or are relatively resistant to it. In the zone's northern portions this almost exclusively implies the millets and sorghums. It is difficult to overemphasize the importance of these grains here; a detailed survey of farms in northern Mamprusi revealed that over 90 per cent of the cultivated land was planted to them (*30*, p. 22). As one moves south, and rainfall becomes higher and more evenly distributed, other crops begin to appear, notably yams, maize, and peanuts. South of the Volta the predominance of the millets and sorghums gives way altogether, their place being taken by yams, maize, and, to a lesser but increasing extent, manioc. Yam production is especially intense along the borders of the Forest zone, this more densely covered transition belt offering near ideal conditions for the crop.

With few exceptions, farming in the Northern Savanna is a subsistence operation; and where movements of foodstuffs take place they are chiefly to satisfy local needs. The only exports of consequence to the more populous and prosperous southern parts of the country are livestock and yams. Cattle come principally from the northern portions of the zone (which adjoin the rich cattle area of Upper Volta), while the southern portions provide most of the yams. Particularly around Wenchi, Ejura, and Kete-Krachi the production of yams for sale is pushed vigorously. As we shall see later, a large fraction of the yams consumed in the cities of the south comes from these regions.

Succeeding the Northern Savanna to the south is the second of Ghana's three major natural regions, the Forest zone. This is the principal source of the country's wealth. Here is grown the cocoa—about one-third of the world's total output—which so dominates the Ghanaian economy. And here too are found most of the mineral resources: gold, around Tarkwa and Obuasi; diamonds in the vicinity of Akwatia; and manganese, again in the neighborhood of Tarkwa. Over half of the population—about 3.6 million people in 1960—is concentrated in this zone (*13*, p. 1). Unlike the Northern Savanna, this region is relatively well provided with both rail and road facilities.

The Forest is a zone of high rainfall. Annual precipitation averages between 50 and 70 inches over most of the area, with portions of the southwest receiving more than 80 inches. The seasonal distribution is that of the intertropical convergence zone: two rainy periods (March–July and September–November) separated by brief dry seasons. In its topographic aspect the area is comparatively high and broken, its northern boundary being a line of hills (the Mampong scarp in Ashanti, the Akwapim-Togo ranges to the east) rising about 1,500 feet above the Voltaian Basin. This surface configuration has an important influence on the region's climate. Acting as a barrier against the harmattan winds which

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gether with a small segment of the Northern Region) and formed into the Brong-Ahafo Region. Further changes were made effective July 1960: the Western Region was divided into the Central and Western Regions: the Northern Region into the Northern and Upper Regions; and Trans-Volta/Togoland was renamed the Volta Region.

In this study the various regions are referred to as they were constituted in 1957 and 1958. I do this mainly because the data collected in the 1957/58 Produce Movement Census (on which I draw heavily in the final part of the paper) had this structure as their basis. To do otherwise would result in a superabundance of footnotes and no small confusion for the reader.

sweep down from the north, it sharply limits the intensity of the dry seasons and has favored the growth of storied, semideciduous forest. (Man's action has, however, reduced much of this cover to low forest and secondary bush.)

As in the Savanna to the north, the production of food crops in the Forest is characterized by shifting cultivation. Clearing and burning prepare the land for cropping, and a given plot is exploited on a temporary basis. After only one, two, or, at the most, three years, a combination of weed intrusion and fertility exhaustion reduces yields to an uneconomic level and forces abandonment; a new plot is then cleared, while the previous one is returned to "bush fallow." But beyond adherence to this basic system there is little similarity in the agriculture of the two zones. In the Northern Savanna production is closely geared to the seasons, with planting taking place at the beginning of the rains each spring and harvesting being done in November and December. In the Forest, on the other hand, year-round cultivation is practicable. Accordingly, a wide variety of perennials as well as annuals can be grown: cocoa, plantains, bananas, kolas, oil palms, manioc, cocoyams, maize, rice, and yams, to mention the most important.

In contrast to the Northern Savanna, where individual or small clusters of dwellings are often widely dispersed, most of the Forest people live in comparatively large villages, with their compounds grouped closely together. Generally surrounding the village is a more or less continuous belt of small vegetable gardens, beyond which lie, helter-skelter, the farm clearings proper. Except for cocoa and rice, which are commonly grown alone, mixed agriculture prevails here, several crops that reach maturity at different times of the year being planted in the same plot. With a new clearing the cycle begins in late March or early April. In a typical sequence maize and manioc are then planted, to be followed a month or so later by plantains and cocoyams. The brief dry period centered in August sees the early maize collected, and often a second crop planted. October–December is the main harvest season. Plantains and cocoyams, however, are gathered almost continuously, as is manioc, which can be harvested as required. As a result food is plentiful throughout the year; so plentiful in fact that manioc and cocoyams, which are generally considered "inferior" foods, are frequently treated as reserve crops and often only partially harvested (*43,* pp. 89–90).

Some impression of the relative importance of the various food crops grown in the Forest is to be had from the area estimates published for 1950 by the Department of Agriculture (*11,* p. 32). In preparing these estimates both political and natural boundaries were respected, except that in Ashanti the forested and savanna portions were not distinguished; the Forest, accordingly, is best represented by that part which falls within the former Gold Coast Colony (the Eastern and Western Regions plus the southern quarter of Trans-Volta/Togoland). Here plantains are eminently the most important crop in terms of acreage, occupying 43 per cent of the area reported in the major staples. Next come cocoyams with 27 per cent, followed by maize and manioc, accounting for 16 and 10 per cent respectively. Yams and rice together were thought to take up no more than 4 per cent of the total. The Forest is by no means a homogeneous area, however, and though this general ranking is probably valid for the zone taken as a whole,

there are marked differences in local cropping. Rice, for instance, is a key crop in the very moist southwestern corner of the zone, as it is in the forested area which extends across the Volta into southern Togoland; indeed in the latter area the 1950 estimates have it occupying a quarter of the land in staple foods.

The importance of food-crop production for sale in outside markets also varies considerably within the zone. Though commercial participation by food farmers in the Forest is almost everywhere greater than in the Northern Savanna, it is greatest in the closely settled portions near the larger towns. These areas commonly enjoy a distinct competitive advantage, notwithstanding the fact (to be brought out later) that the larger centers draw their food supplies from considerable distances. Not only are they nearer the final markets; they also enjoy superior road facilities. Particularly in the densely peopled southeastern corner of the Forest between the Pra and Volta rivers (especially in the Swedru-Nsawam-Koforidua sector, where the effects of Swollen Shoot disease have been most heavily felt by cocoa farmers) and within a radius of about 30 miles of Kumasi, production of food crops for the market accounts for a substantial share of total output. In contrast, many of the more distant sections of Ashanti and the Western Region contain extensive tracts of excellent farm land which are exploited entirely on a subsistence basis.

The third and smallest of Ghana's natural regions is the Coastal Savanna. Reflecting the dry conditions which obtain along the West African coast east of Cape Three Points, this zone, with its scrubby vegetation, presents a sharp contrast to the adjacent forest. West of Accra it is confined to a narrow strip never more than 10 to 15 miles wide; but to the east it broadens out to embrace a comparatively wide plain. With a population of about 1.3 million, it is the most densely settled of the three regions. Including as it does both Accra and Sekondi-Takoradi, the country's chief ports and first- and third-ranking cities, it is also the most urbanized. According to preliminary returns from the 1960 census, these centers, together with Cape Coast, Winneba, and Keta, contain well over a third of the inhabitants of the region (*13*, p. 1).

The Coastal Savanna's only important resource is its location. Strategically situated between the Forest and outside markets, it has historically offered attractive opportunities for trade and settlement. Agriculturally, its capabilities are quite limited. Rainfall is the lowest in the country, averaging between 30 and 40 inches. Nonetheless, several factors combine to make production somewhat more flexible than in the Northern Savanna. Precipitation, in the first place, is more evenly distributed over the year, following the bi-modal pattern found in the Forest, while seasonal aridity is less intense, the full effect of the harmattan being avoided.

Two crops, maize and manioc, completely dominate agriculture in the Coastal Savanna, occupying, according to the estimates of the Department of Agriculture, 47 and 43 per cent, respectively, of the land in staple foods (*11*, p. 32). Though both crops do well here (they are about the only staple crops that do), manioc is the more widely dispersed. Tolerant of both poor soils and drought, it is almost the sole crop of the dry, overcropped plains around Accra. Maize, on the other hand, has slightly higher moisture requirements and is chiefly found in the more humid portions behind Keta and along the escarpments which border the

plain on the north and which coincide with the beginning of the Forest. In these regions two crops a year are possible. In contrast to the Forest, where the tsetse fly limits the livestock population to sheep, goats, and fowl, cattle are also raised in the Coastal Savanna. They are kept more for prestige purposes than for sale, however, and slaughterings are limited (*44*, p. 77).

As would be expected in view of the semiurban and mercantile character of the Coastal Savanna, food crop production here has become increasingly commercialized. Along the roads leading into the principal towns especially, market cropping of both vegetables and staple foods is a major industry. The zone is, however, capable of meeting only a fraction of the needs of these centers; and, as we shall see below, they rely heavily on the Forest and beyond for their food supplies.

Urbanization

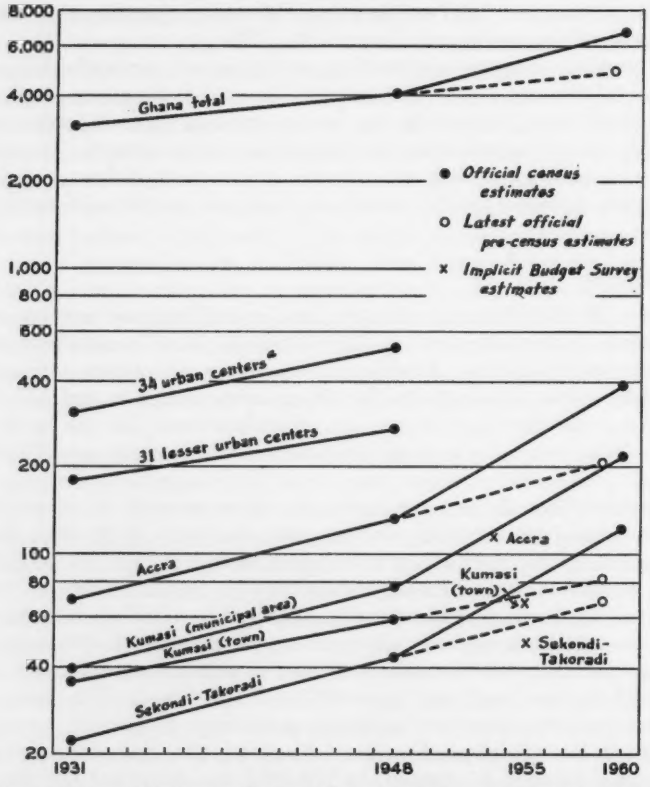
As in Middle Africa generally, urbanization in Ghana has been proceeding at a rate far faster than over-all population growth. How much faster is, unfortunately, not entirely clear. As with many less-developed countries—African ones particularly—the population data for Ghana leave much to be desired. This is not to say that there have been no censuses; there have. But the results have been so inconsistent as to seriously limit their usefulness as indicators of historical trend.

Consider Chart 2. In it are plotted various estimates of the country's total population and the size of its principal cities. Connected by the solid lines are the figures reported in the last three censuses: that of 1931, "the first in which the entire population was individually counted" (*18*, p. 7); that of 1948; and that of 1960, for which only provisional and incomplete returns are yet available. Also shown are the latest estimates which were made prior to the 1960 count—estimates which, though for the cities were based on water-consumption data, closely followed the trend suggested by the 1931 and 1948 figures. The discrepancies between the 1959 estimate and the 1960 count are huge. In mid-1959 the country's population was officially reckoned at 4.9 million. The 1960 census returned a provisional figure of 6.7 million. In 1958/59 it was considered that the Accra and Sekondi-Takoradi water systems supplied populations of 208,000 and 68,000, respectively. The 1960 enumeration suggests that 388,000 and 121,000 would be better estimates. For Kumasi the comparison is less easy, because unlike Accra and Sekondi-Takoradi, whose municipal areas are almost entirely urban in character, the domain of the Kumasi Municipal Council includes both the town proper and a semirural suburban area. Nevertheless, a striking difference in the estimates may be perceived. The 1958/59 water figure gave the town 82,000 persons, as opposed to 221,000 for the municipal area in the 1960 census. It is generally agreed that the town's population accounts for well over two-thirds of the municipal total.

Manifestly the three censuses cannot be used together: either the 1960 figures are gross exaggerations, or the 1931 and 1948 counts understated reality by a considerable margin. In all probability the latter is the case, though it would be foolhardy to suppose that the level of accuracy attained in 1960 was anything like that achieved in more advanced countries. But the 1960 enumeration, preceded

CHART 2.—GHANA: VARIOUS ESTIMATES OF TOTAL AND URBAN POPULATION, 1931–60*

(Thousand persons: logarithmic vertical scale)



* Data for 1931 and 1948 from Gold Coast, Off. Govt. Stat., *Census of Population, 1948, Report and Tables* (1950). Data for 1960 are provisional and are from Ghana, Off. Govt. Stat., *Quarterly Digest of Statistics*, June 1960, p. 1. Estimate of total population, mid-1959, from *ibid.*, March 1960, p. 1. Estimates for urban areas, 1958/59, from Ghana, Min. Fin., *Economic Survey, 1959* (1960), p. 47. Implicit budget survey estimates were obtained by multiplying by four the number of persons enumerated during the "population enquiry" phases of the surveys, as these purported to cover close to 25 per cent of the populations. Multiplicands are from Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *1953 Accra Survey of Household Budgets* (No. 2, December 1953), p. 3; *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), p. 18; and *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), p. 16.

[a] Communities reported to have 5,000 or more inhabitants in 1948.

by a "census education" campaign of almost six-months duration (which reached a climax with countrywide festivities on "census night")[6] and carried out with the assistance of United Nations' experts, was almost certainly the most accurate count thus far taken (*14*, pp. 15–16). Both the 1931 and 1948 censuses, on the other hand, have long been suspect. Indeed, the officer in charge of the 1931

[6] An exceptionally clever device for allaying suspicions, by the way, and one which reflects credit on the census authorities.

enumeration called attention to numerous specific inaccuracies and stated that a majority of his subordinates "were of the opinion that the figures collected by them are lower than they should have been by from 2 per cent to 10 per cent" (*8*, p. 123).

There are grounds for believing the 1948 census was similarly incomplete, this despite the fact that the count was technically much better organized. Early 1948, when the census was taken, was a time of considerable civil unrest throughout the country. Cocoa growers were bitterly opposed to the government's program of compulsory cutting of trees affected by Swollen Shoot; and in the cities the discontent which was to culminate in the bloody riots of February and March was rife (*37*, pp. 15–16). This situation undoubtedly reinforced the African's traditional suspicion of the census taker (based on the not unfounded fear that his visit would be followed by one from the tax collector), and makes it highly likely that a sizable proportion of the population was at pains to avoid enumeration.[7]

As indicators of the course of urban growth in Ghana, then, the pre-1960 figures have only limited value. They are not totally useless, however. While apparently inaccurate in so far as absolute magnitudes are concerned, they probably reflect *relative* movements accurately enough. In any event they are all we have, so use them we must.

Again consider Chart 2. It will be seen that between 1931 and 1948 the population as a whole was thought to have increased from 3.2 million to 4.1 million, or by 30 per cent. (Such an increase would reflect an average annual growth rate of 1.56 per cent—not an unreasonable figure.) During the same interval, in contrast, the number of people thought to be living in the country's 34 urban centers rose by 68 per cent, from 314,000 to 527,000. But if the rate of over-all urban expansion was over double that of the total population, most of it was in the three principal cities. Accra, Kumasi, and Sekondi-Takoradi, which are together thought to contain about half of Ghana's urban dwellers, were each reported to have experienced a population increase of over 90 per cent during the period. The 1960 figures suggest that the rate since has been even faster.

Accra, the capital and largest city, owes its growth and pre-eminence to several factors. Like most of the other coastal towns, it had its beginning in the seventeenth century as a settlement surrounding one of the numerous European trading forts. These coastal communities grew and prospered directly with the ease and extent of their contacts with the interior. Thus, though Accra's future was assured by its choice in 1877 as the colony's capital (under the mistaken notion that it would prove a more healthful site than Cape Coast), its real rise to pre-eminence dates from the construction of the eastern rail line. Begun in 1905 and completed, after innumerable delays, to Kumasi in 1923, this line tapped the newly developing cocoa areas of the southeastern Forest. As its ocean terminus, Accra flourished; quickly becoming the chief exporter of cocoa, it dominated the trade until Takoradi harbor was completed in 1928. The 1931 census gave its population at almost 70,000, nearly four times the 1911 figure.

[7] Supporting this thesis are the findings of a social survey conducted in one of the older districts of Cape Coast in 1953. One of the few such surveys to be based on an actual count instead of a sampling of persons carried on the tax rolls, it revealed the population to be over double that reported in the 1948 census (*36*, p. 37).

Accra's growth during the last 30 years reflects more than anything else the over-all development of the country's economy. Though surpassed by Takoradi as the foremost port, it remains firmly established as Ghana's commercial and administrative center. As the political capital, too, it has profited immensely from the recent expansion of government's importance. The municipal area has had to be enlarged repeatedly; and in 1960 its population was put at 388,000 (*1*, pp. 16–31; *13*, p. 1).

Kumasi, Ghana's second city and chief inland metropolis, is the capital of the Ashanti people—a fact which has contributed in no small part to its present position. Unlike the other peoples of Ghana, the Ashanti have long enjoyed a substantial measure of political unity; and as the seat of their king, Kumasi is today, as it was at least 200 years ago, the focus of their cultural and political lives. More recently, however, its importance derives mainly from its location at the hub of inland communications. Reached by the western railroad in 1903, it rapidly developed into a major collecting center for cocoa and the staging point for trade between northern Ghana and the Forest—positions that were further strengthened 20 years later with the completion of the eastern line. By 1931 the city and its suburbs were thought to include over 40,000 persons, as opposed to only 6,000 twenty-five years earlier. Since then, aided greatly by the westward migration of cocoa production and by construction of an extensive network of feeder roads, Kumasi has boomed. The 1960 census returned a provisional figure of 221,000 for the population of its municipal area (*10*, pp. 160–61; *33*, pp. 4–7; *13*, p. 1).

If railroads and cocoa largely explain the initial rise of Accra and Kumasi, the combination was railroads and gold in the twin cities of Sekondi-Takoradi, Ghana's third ranking urban center. Founded like Accra, in the shelter of European trading "factories," the towns' site enjoyed no special advantages over its many competitors until 1898, when Sekondi was selected as the terminus for the western railway. Originally built to serve the gold fields around Tarkwa, this line was soon extended to Kumasi and later, by a branch, to the diamond area around Akwatia. Drawing on such an extensive hinterland—rich in timber and cocoa as well as minerals—the town could not but thrive. Nonetheless, it did not really hit its stride until after the completion in 1928 of Takoradi harbor. As the country's first, and until 1961 only deep-water facility (all the other ports except the new one at Tema are open roadsteads, requiring the use of inefficient and costly surfboats), it immediately supplanted Accra as the chief port, drawing traffic even from east of the Volta. The 1948 census put the population at 44,000, an increase of 95 per cent over the 1931 figure. The provisional estimate for 1960 is 121,000 (*7*, pp. 2–3; *13*, p. 1).

As would be expected in view of the exceedingly rapid growth of Ghana's three major cities, a high proportion of their citizenry is composed of "migrants" (i.e., persons born elsewhere). This is particularly true of Sekondi-Takoradi and Kumasi, where, as Table 2 indicates, no less than 78 and 70 per cent, respectively, of the persons enumerated in 1948 were born somewhere else. In Accra the figure was somewhat lower, 46 per cent, but the extent of that city's growth during the last 12 years makes it not improbable that even there native-born persons are now in a minority.

This influx of newcomers has carried before it much of the cities' regional flavor. As Table 2 makes clear, the pull of Ghana's towns has made itself felt over a considerable portion of West Africa. The data suggest that fully 40 per cent of the migrants to Accra, for instance, come either from the relatively distant Northern Region or from other countries (chiefly Nigeria and the former French territories to the north of Ghana). Of the 62 tribal divisions of Ghana recognized in the 1948 census, all but two were represented in Accra; and the same count indicated that the indigenous Ga people accounted for only 52 per cent of the inhabitants (*1*, pp. 30–31). If similar breakdowns were available for Kumasi and Sekondi-Takoradi, they would almost certainly show that in these centers too the predominance of local tribes had become equally precarious.

As is true throughout Middle Africa, the stream of migrants into Ghana's cities is made up of many more men than women, with the consequence that there is a sharp imbalance in the sex composition of their populations. In Kumasi, for every 100 females in the 16- to 44-year age bracket enumerated in 1948, 136 males were counted. The disparity was even greater in Accra and Sekondi-Takoradi. There the census recorded, respectively, 140 and 152 working-age men for every 100 women (*18*, pp. 45, 51). Many of these men are unmarried; others have left their families behind. On arriving in town they tend either to rent living space from an established household (illegally if the dwelling is in a government-housing estate) or to cluster together in dormitory-type buildings, four or five or even more to a room (*40, passim*). The social instability which results is, of course, considerable; and it is aggravated by the fact that much migration is of a temporary character. Many of the migrants, especially the married men, remain in town only a year or so—until they can accumulate a certain amount of money or purchase certain goods—after which they return to their homes. An impression of the prevalence of these "target workers" may be had from Table 2. Roughly 60 per cent of the male newcomers enumerated in each of the three cities in 1948 stated that they had lived there for less than five years, and a quarter of them indicated that they had been there for less than one year.

The picture of Ghana's cities that emerges, then, is one of extremely rapid growth and of a heterogeneous citizenry which has yet to take root—of people whose ties to their place of residence are as often as not unreinforced by those of kinship or home. What bearing has this on the dietary characteristics of the communities? Prima facie, it suggests that one would probably search in vain to identify dietary preferences typical of all the people. It also suggests that among the high proportion of single people ready-made or easily prepared foods would find an uncommonly receptive market.

CONSUMPTION CHARACTERISTICS

Our insight into the dietary behavior of Ghana's urban dwellers rests mainly on the findings of three surveys of household budgets carried out some years ago in Accra, Kumasi, and Sekondi-Takoradi (*20, 21, 19*).[8] These surveys contain a

[8] A fourth survey has been conducted in the Volta River town of Akuse. Because Akuse, with a population according to the 1948 census of less than 5,000, hardly ranks as a true urban center, this survey is not considered here.

TABLE 2.—ACCRA, KUMASI, AND SEKONDI-TAKORADI: DISTRIBUTION OF POPULATION BY BIRTHPLACE AND DURATION OF RESIDENCE, 1948*

(Per 1,000 of total population)

City and Sex		Total	Born in city	All migrants	Birthplace of migrants					Duration of residence of migrants		
					Colony[a]	Ashanti	Northern Terr.	Togoland	Foreign countries	Less than 1 year	1–4 years	5 years or more
Accra	Total	1000	538	462	205	25	61	49	122	118	156	188
	Males	1000	463	537	207	29	88	52	161	149	166	222
	Females	1000	627	373	204	19	29	45	76	82	144	147
Kumasi[b]	Total	1000	297	703	189	271	134	22	87	177	228	298
	Males	1000	277	723	165	251	172	23	112	198	224	301
	Females	1000	321	679	217	293	90	20	59	152	232	295
Sekondi-Takoradi	Total	1000	219	781	498	31	69	25	158	174	277	330
	Males	1000	197	803	456	34	97	26	190	186	272	345
	Females	1000	246	754	552	28	33	22	119	158	285	311

* Based on data in Gold Coast, Off. Govt. Stat., *Census of Population, 1948, Report and Tables* (1950), pp. 16, 362, 366.
[a] The Eastern and Western Regions plus the southern quarter of Trans-Volta/Togoland.
[b] Excluding suburbs.

wealth of evidence, most of it covering matters which previously had been the subject of conjecture alone. They are, of course, not without their shortcomings. As with similar ground-breaking investigations undertaken elsewhere in Middle Africa, their usefulness is somewhat limited by the fact that they relate only to short periods of time and to restricted segments of the population. These and other deficiencies dictate that the surveys be interpreted with care and the data not pressed too rigorously.[9] But they are not such as to invalidate the basic worth of the more general findings.

The Budget Surveys

Ghana's three urban budget surveys were conducted in 1953 (Accra) and in 1955 (Kumasi and Sekondi-Takoradi). All were undertaken by the Office of the Government Statistician, and all had as their *raison d'être* that agency's desire to relate the weighting systems used in its indices of local prices to actual expenditure patterns. Although no two of the surveys were exactly alike, the same general procedures were followed in all.

The surveys consisted of two parts: a broad "population enquiry" and the detailed budget survey proper. The function of the first part, though instructive in itself, "was to provide a frame from which to select households for budget recording and to show precisely to what section of the community the budgets related" (*21,* p. 1). Toward this end it was based on a rather large sample, an enumeration of 25 per cent of the African population in each municipality (or town area in Kumasi) having been the objective. The sampling unit was the house; the municipal property tax lists the basis for selection. Every fourth address was visited, and each identifiable household—defined as "a group of persons living and feeding together, i.e., a group forming a definite economic unit" (*21,* pp. 1–2)—was questioned as to family size and structure, occupation and income, and the number of rooms occupied. The only intentional omissions were army barracks, government bungalows, and buildings classified as non-residential.

That anything even approaching a 25 per cent sample was actually achieved in any of the population inquiries is highly improbable. At the time it was thought that coverage was reasonably complete; now the evidence points clearly to the contrary. In all, 58,033 persons were enumerated—29,123 in Accra, 16,663 in Kumasi, and 12,247 in Sekondi-Takoradi (*20,* p. 3; *21,* p. 16; *19,* p. 18). If these figures are multiplied by four (as has been done in Chart 2) the results fall far short of the total populations suggested by the last two censuses; this remains true even if allowance is made for the small number of individuals (notably whites, transients, and members of the military) intentionally overlooked.

One can only speculate as to the causes of this understatement. It is not unlikely, however, that use of the tax books as the basis for selection was a contributing factor. As the 1960 census revealed, the three municipal councils, at the time of the surveys, had no idea of how many people they were administer-

[9] Accordingly, I intentionally pass over without comment many of the minor inconsistencies which will be readily apparent to the reader.

ing; and though they were probably not equally ignorant of the number of dwellings within their jurisdiction, it is quite probable that difficulties were encountered in drawing up the tax lists. We are informed that in Accra, for instance, to find a particular house is often a major undertaking, there being no map which shows all street names. Furthermore, in some wards there are no identifying house numbers, while in wards where there are numbers these are not consecutive, but refer to an arbitrary order in a sanitation district (*4*, p. 171). Under such conditions it would be surprising indeed to find that the tax lists were complete.

Also presumably involved were some of the same factors which led to underenumeration during the 1948 census: political tension—especially evident in Kumasi at the time of its survey (*19*, p. 2)—and the African's long-standing suspicion of strangers, particularly those acting in some official capacity. Not a few houses in urban Ghana, especially those occupied by migrants, contain upwards of 100 persons, and, as more than one government researcher has found, "it is common for the occupants to deny the existence of a person who is actually in the crowd of occupants expressing the denial" (*4*, p. 171). That many men either were successful in doing just this during the population inquiries or were otherwise missed by the enumerators appears likely. This conclusion is suggested by comparing the adult sex ratios found in the samples with those reported in the 1948 census (which, though it was also incomplete, was to all appearances a more reliable count). Such a comparison between the 1948 census figure and the population inquiry figures, multiplied by four, is made in the following tabulation (in thousand persons) (*20*, p. 55; *21*, p. 26; *19*, p. 30; *18*, pp. 45, 51):

Sex	Accra	Kumasi	Sekondi-Takoradi
	1948 Census		
Adult males[a]	49.5	20.9	17.7
Adult females[a]	37.3	14.9	11.2
	Population Inquiries, 1953–55		
Adult males[b]	27.6	18.7	16.2
Adult female[b]	31.3	19.1	13.1

[a] Persons 16 years and older.
[b] Persons 15 years and older, except in Accra where 19 and older.

The differences are startling. Whereas the census indicates a strong male predominance in all three cities, the population inquiries imply that in Accra and Kumasi women are actually in the majority and that in Sekondi-Takoradi they account for fully 45 per cent of the adult population. Manifestly you cannot have it both ways; and it is worth noting that to hold in favor of the population inquiries would involve some rather tenuous hypotheses. One would have to assume, in the first place, that women were grossly underreported in 1948. There is, in fact, evidence that some women did hide from the enumerators (cf. *1*, p. 38), but that they would do so in great numbers during the census and then not do so a few years later seems improbable. Furthermore, one would have to argue that men, who are away at work all day, find it less easy to avoid enumeration

during a *house-to-house* survey than do women. And finally, one would have to contend that for some unknown reason the sex ratio in Ghana's cities differs sharply from that prevailing elsewhere in urban Middle Africa.

All this rather strongly suggests that the "frames" provided by the population inquiries were biased toward overenumerating of women. Nonetheless, any atypicalities in the budget samples introduced at this stage were decidedly of a secondary nature. For in selecting the households to be used for detailed budget analysis no attempts were made to draw on cross sections of the populations. Instead the samples were intentionally constructed so as to relate only to clearly defined portions of the three communities.

The bases on which the three budget samples were selected are shown in outline form in Table 3. It will be seen that whether or not a given household was considered for one of the samples depended on both its size and composition as well as on the source and level of its income. The exact criteria differed somewhat between the surveys. Most significant of these differences pertained to income source. Households without wage earners were omitted from both the Accra and Sekondi-Takoradi surveys. In deciding on this restriction the authorities were guided by the fact that the surveys' chief end-products were to be weighting systems for use in preparing indices of local prices. Households depending mainly on wage incomes, it was reasoned, would be the ones primarily affected by price changes (the incomes of traders and the like being more responsive to the level of prices): if so, indices mirroring their expenditures would be the most instructive. This restriction, however, was not applied in Kumasi. The economic structure of Kumasi differs markedly from that of the other two cities. Both Accra and Sekondi-Takoradi contain appreciable numbers of wage earners: notably employees of commercial firms, the Government, and the port in the former; and of the port and the railroad in the latter. Kumasi, on the other hand, is still chiefly a trading center, and most of the workers are self-employed. Of the households enumerated during the population inquiry, only 34 per cent received income from wages (*19*, p. 4). To have limited the budget survey to just these households would clearly have defeated its purpose.

Otherwise, the factors governing the coverage of the samples were much the same in all three surveys. Unfortunately, households with either very high or very low incomes were not considered, all households in Kumasi and Sekondi-Takoradi with monthly wage incomes outside the range £5 to £15 having been disqualified, as were those in Accra whose heads earned less than £50 or more than £180 yearly (£4 4*s.* to £15 monthly). Still others were ruled out on "practical considerations": e.g., single persons and households lacking an adult female were omitted on the ground that they would obtain much of their food at snack bars or from cateresses, and households with nine or more members or with more than a few sources of income were excluded to avoid unduly complicated budgets. After these and a few other minor exclusions, there remained homogeneous groups of households which could be described rather closely:

> *Accra.*—Wage-earning households of 2 to 8 persons (excluding those of one adult and three or more children), with no more than two income earners, and with wage-earning heads in the income range of £50 to £180 per year (*20*, p. 4).

TABLE 3.—ACCRA, KUMASI, AND SEKONDI-TAKORADI: SELECTION OF BUDGET SURVEY SAMPLES, 1953 AND 1955*

Accra		Kumasi		Sekondi-Takoradi	
Households in Population Enquiry..	4,898	Households in Population Enquiry..	4,337	Households in Population Enquiry..	3,420
Households excluded (in sequence):		Households excluded (in sequence):		Households excluded (in sequence):	
1. Nonwage-earning heads	2,566	1. No regular income, or four or more incomes	323	1. Without wage earners	1,063
2. Annual income of head under £50 or over £180	735	2. Single persons	770	2. Monthly wage income under 100*s.* or over 299*s.*	606
3. More than one income earner besides head	192	3. Nine persons or more	198	3. Single persons	555
4. Single persons	260	4. Monthly wage income under 100*s.* or over 299*s.*	306	4. Nine persons or more	36
5. Nine persons or more	109	5. Without adult female	206	5. Without adult female	120
6. One adult and more than two children	24	6. Living in outskirts	55	6. Three or more nonwage incomes	17
Total households excluded	3,886	Total households excluded	1,858	Total households excluded	2,397
Households meeting Burget Survey criteria	1,012	Households meeting Budget Survey criteria	2,479	Households meeting Budget Survey criteria	1,023
as percentage of all households....	*21*	*as percentage of all households*....	*57*	*as percentage of all households*....	*30*
Budgets recorded	500	Budgets recorded:		Budgets recorded:	
		By 90 teachers	450	By 90 teachers	450
		By 20 staff members	120	By 16 staff members	96
Total useable budgets	453	Total useable budgets	570	Total useable budgets	546

* Data from Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *1953 Accra Survey of Household Budgets* (No. 2, December 1953), pp. 5, 9; *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), pp. 7–8; and *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), pp. 6–7.

Kumasi.—Households of 2 to 8 persons (at least one of whom was an adult female), with 1 to 3 incomes from all sources, but with any wage income in the range £5 to £15 a month, excluding those living in the outskirts (*19*, p. 7).

Sekondi-Takoradi.—Wage-earning households of 2 to 8 persons (at least one of whom was an adult female), with no more than two sources of nonwage income, and with wage incomes in the range £5 to £15 a month (*21*, p. 7).

From among these households the budget samples were chosen at random.

The effect of these selection procedures on the applicability and relative coverage of the samples defies precise appraisal. Table 3 shows the proportion of the households enumerated in each population inquiry which met the budget survey criteria. It will be seen that over-all coverage was greatest in Kumasi, where 57 per cent of the households qualified for the sample, and smallest in Sekondi-Takoradi and Accra, where only 30 and 21 per cent qualified. This difference mainly resulted from the exclusion from the survey in the latter two communities of households without wage earners. In Accra 57 per cent of the households received income from wages and the sample related to 36 per cent of them; in Sekondi-Takoradi the figures were 69 per cent and 43 per cent, respectively (*19*, p. 4).

Comparisons such as these are not particularly instructive, however, and beyond them there is precious little to go by. This because, though coverage *per se* was closely defined, next to nothing exists to which it can confidently be related. In so far as household size and composition is concerned, the 1948 census sheds no light, while the findings of the population inquiries were almost certainly biased in favor of women. That this bias was carried over to the samples may safely be assumed, and also that it was magnified by the exclusion of single persons. But apart from this, and the fact that the samples clearly covered households of larger than average size, further refinement is impossible.

The picture with respect to income coverage is similarly obscure. What the distribution of incomes is among Ghana's urban dwellers is just about anybody's guess. True, the households visited during the population inquiries were questioned as to income, but because of the difficulty of assessing nonwage revenue during a single interview, the scope was restricted to income from wages. The findings in all three cases were much the same. In both Kumasi and Sekondi-Takoradi it was observed that fewer than one per cent of the wage-earning households had monthly wage incomes of less than £5 and that roughly a quarter of them received more than £15 (*21*, p. 21; *19*, p. 24); while in Accra it was found that "the range of £50–180 per annum covered almost the entire lower income range and included nearly 70 per cent of all families with wage-earning heads" (*20*, p. 4). But if this suggests that the surveys related to households in the middle- and lower-income brackets, there is no evidence that they included any falling below the so-called "poverty line." This would imply that they did not have enough to eat; and it is brought out below that the average apparent caloric intake per capita reported for the Kumasi and Sekondi-Takoradi samples (quantity data were not collected in Accra) was quite adequate and varied little from

one expenditure class to the next. What effect (if any) the inclusion of households with nonwage incomes or multiple sources of revenue had on this rough picture is entirely a matter for conjecture; it can only be inferred that it was reasonably uniform. Per capita monthly expenditure differed little among the three samples: £3 14*s.* in Accra, £3 8*s.* in Kumasi, and £3 3*s.* in Sekondi-Takoradi (*21*, p. 11).

The budget surveys were carried out about a month after the population inquiries and in each instance covered a period of 30 days (during May–June in Accra, March–April in Kumasi, and February–March in Sekondi-Takoradi). The briefness of this period is to be regretted; as elsewhere in Middle Africa there are important seasonal changes in the dietaries of the urban Ghanaians. It was felt, however, that this shortcoming would be more than compensated for by the larger number of budgets which a single month's record would permit.

In all, 1,569 useable budgets were obtained—453 of them in Accra (where 47 had to be discarded), 570 in Kumasi, and 546 in Sekondi-Takoradi. Records of both income and expenditure were collected for each household. On the expenditure side[10] provision was made for data of two types—a daily accounting of all domestic outlays (excluding those of a purely transfer nature), and an estimate of the preceding twelve months' disbursements for clothing and durable goods. Because items of a durable character are purchased irregularly, the findings were used in conjunction in arriving at a figure for "normal" monthly expenditure. This was defined as "one-twelfth of the annual expenditure on clothing and durables plus the survey period expenditure on other domestic items" (*21*, p. 10). This definition is worth bearing in mind; on its terms the analysis of the budgets is grounded.

The day-to-day data collecting was done both by permanent members of the Government Statistician's staff and school teachers employed on a part-time basis. During the Accra survey the former acted as supervisors, while 100 teachers did the actual recording. Each was assigned responsibility for five households. These were visited every evening and their expenditures entered, item by item, in specially printed booklets. In the other two cities a slightly different procedure was followed. Again teachers—90 were employed in both instances—handled five budgets apiece, but in addition to their supervisory duties each of the permanent interviewers (20 in Kumasi, 16 in Sekondi-Takoradi) was made responsible for six households. These households were selected as a subsample from the main group and were dealt with in somewhat greater detail; in their case quantities as well as values were ascertained. For items not purchased by definite units, quantities were determined by weighing. The permanent interviewers were equipped with scales and arranged to meet the housewives daily after mar-

[10] The income side of the budgets has little relevance to the present inquiry. Net income per household can be estimated for neither the Kumasi nor the Sekondi-Takoradi samples. This because, though both wage and nonwage income was recorded, no account was kept in the nonwage ledger of changes in stocks and credit transactions. In Accra, on the other hand, each household was asked to estimate its net income. But, either because of an unwillingness or inability to state this figure accurately, these estimates were so unlikely (suggesting dis-saving was the rule in the higher income brackets, saving in the lower) that for Accra too the budgets were analyzed on the basis of expenditure rather than income class.

It is not possible, therefore, to infer anything about the precise extent of saving and dis-saving during the survey periods. Probably it was small.

keting. These quantity figures provided an exceptionally detailed picture of diet composition; accordingly, the Kumasi and the Sekondi-Takoradi surveys are somewhat the more valuable.

Expenditure Patterns

The over-all expenditure patterns revealed by the surveys were remarkably similar (Table 4). In all three cities food was by far the largest item of household expenditure, accounting for an average of 57 to 58 per cent of all domestic outlays. Next came clothing, taking up between 12 and 15 per cent of expenditures, followed by rent and taxes (5 to 8 per cent), fuel and light (4 to 6 per cent), and drink and tobacco (4 to 6 per cent). Services, household durables, and miscellaneous items together accounted for no more than 10 to 14 per cent.

That food should bulk so large in the domestic expenditures of Ghana's urban dwellers is not surprising; although an average per household figure of 57 to 58 per cent is considerably higher than one would expect to encounter in all but the lowest-income classes in advanced regions, it is wholly consistent with the findings of similar investigations undertaken in other low-income countries.[11] What is surprising (to one accustomed to analyzing Western budgets, at least) is the constancy of the figure throughout virtually the entire expenditure (income) range. This is brought out clearly in Chart 3. In both Accra and Kumasi the proportion of total expenditures allocated to food declined but slightly with an increase in total domestic outlays. The extreme observations are worth noting. In the lowest-expenditure class observed in Accra food absorbed 63.3 per cent of all outlays, whereas in the highest class it accounted for 58.3 per cent; in Kumasi the percentages were 56.2 and 52.7, respectively—all this among samples which embraced over a fivefold difference in total expenditures between the extreme classes. Only in the Sekondi-Takoradi sample was there a truly pronounced drop, with the proportion of expenditures allocated to food declining from 63.8 per cent in the lowest class to 42.5 per cent in the highest. But a word of caution about Sekondi-Takoradi. Over a third of the decline there was accounted for by the highest-expenditure class. This class included only 10 house-

[11] Some findings of a cross section of recent surveys (*23*, Tables AII and B11):

Country	Year	Coverage	Number of households	Per capita expenditure[a]	Per cent spent for food[b]	"Income" elasticity of food expenditure[c]
Egypt	1955	3 villages	493	70	70.7	.92
Ceylon	1952–53	All population	1,085	85	63.1	.82
Ghana	*1953*	*Accra*	*453*	*124*	*58.0*	*.98*
Portugal	1950–51	Porto	667	160	62.8	.72
Puerto Rico	1952	Urban wage earners	786	218	51.4	.80
Italy	1953–54	Nonfarm population	1,599	285	57.8	.66
Cuba	1951	Havana	881	549	43.8	.73
Canada	1955	5 large cities	787	1,298	26.8	.40
United States	1955	Urban population	2,241	1,504	32.5	.44

[a] Annual average per capita living expenditures in U.S. dollars, converted at official exchange rates, in 1955 prices.

[b] Per cent of total expenditures.

[c] Double-log coefficient of expenditure elasticity, the influence of household size having been eliminated.

holds, and we are advised that the pattern of their expenditures was distorted by some "irregular" payments for services and rent (*21*, p. 13). The inference is that in Sekondi-Takoradi as well, food items commanded a rather constant proportion of total outlays per household.

TABLE 4.—GHANA, URBAN HOUSEHOLD BUDGET SURVEY SAMPLES, 1953 AND 1955: DOMESTIC EXPENDITURE PATTERNS*

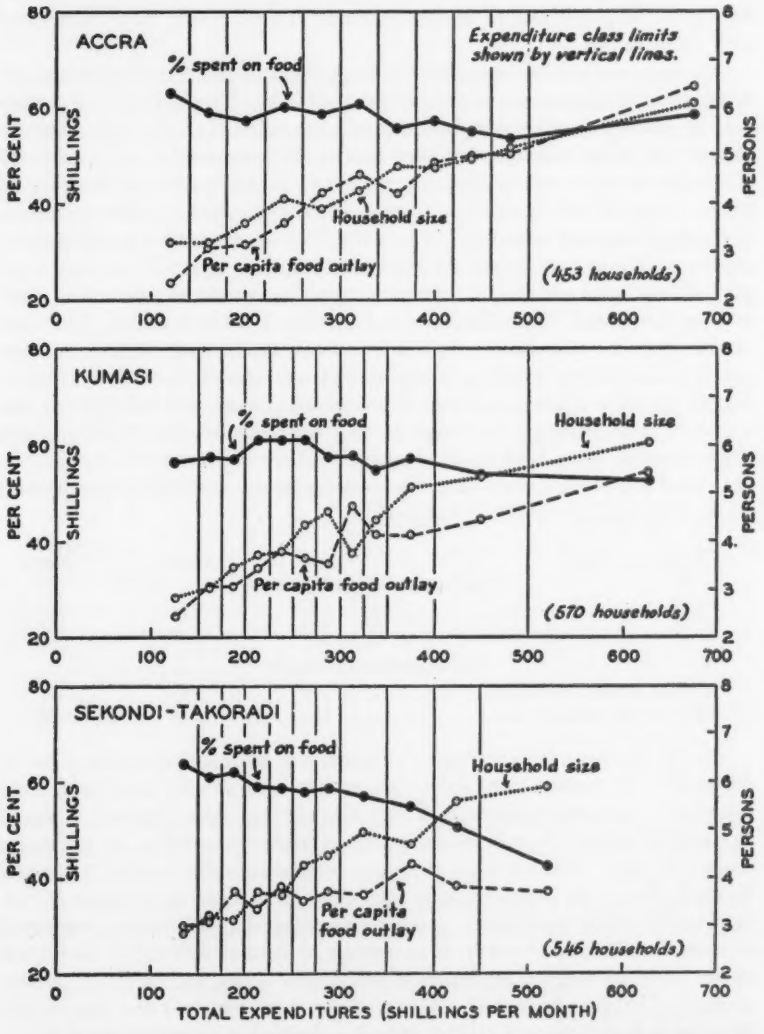
Item	Accra (May-June 1953)	Kumasi (Mar.-Apr. 1955)	Sekondi-Takoradi (Feb.-Mar. 1955)
Expenditures by Uses (*per cent*)			
Food	58.0	57.3	57.7
Clothing	12.1	13.8	14.8
Rent and taxes	5.4	7.5	6.0
Fuel and light	4.7	6.2	6.0
Drink and tobacco	6.1	4.2	5.1
Services	5.8	5.8	4.9
Durable goods	3.6	2.1	2.5
Miscellaneous	4.3	3.1	3.0
Total	100.0	100.0	100.0
Sample Characteristics			
Number of households	453	570	546
Average size (*persons*)	4.24	4.15	3.98
Average monthly expenditures (*shillings*)	314	282	249
Per capita monthly expenditures (*shillings*)	74	68	63

* Data from Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), pp. 11–12.

The explanation for this result is to be sought in terms of several factors, some clear-cut, some obscure. Chief among the latter, to be sure, is the question of the samples themselves and, more specifically, of the income sectors to which they pertained. This, it has been noted, is a point of singular elusiveness, our only firm bench mark being that data for wage incomes suggest that coverage was restricted to households in the lower- and middle-income ranges. But what about nonwage receipts? Were these sufficiently large to elevate some of the households to the upper-income echelons, and to provide a reasonable cross section of incomes? Certainly expenditures in the highest classes were not paltry. In Accra, for instance, the average monthly outlay in the highest-expenditure class was 675 shillings, pointing to annual receipts, if savings are ruled out, of the order of £405. This sum compares not unfavorably with the 1954 scale for Grade-5 civil servants, the highest grade in the Government to which an African could then normally aspire.[12] I suspect, nonetheless, that even these households fell not in the upper, but the middle-income reaches, for household income in

[12] In that year the lowest starting wage for Grade-5 civil servants was £220, with £580 as the possible ultimate salary (*1*, p. 67).

CHART 3.—GHANA, URBAN HOUSEHOLD BUDGET SURVEY SAMPLES, 1953 AND 1955: PERCENTAGE OF TOTAL DOMESTIC EXPENDITURES SPENT ON FOOD, PER CAPITA MONTHLY FOOD OUTLAYS, AND HOUSEHOLD SIZE, BY EXPENDITURE CLASS*



* Based on data in Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers) *1953 Accra Survey of Household Budgets* (No. 2, December 1953), pp. 10–12; *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), pp. 36–37; and *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), pp. 32–33. Positioning of data for extreme expenditure classes reflects actual average expenditures; for other classes the midpoint. Figures do not include expenditures on drink.

urban Ghana is a close function not only of the level of individual incomes, but of household size as well. Accepting this interpretation as correct, it may well be that had truly high-income households been included in the samples, the expected decline in the proportion of outlays allocated to food would have manifested itself more strongly.

Turning now to a less speculative consideration, there is the relationship just mentioned—that between income and household size. This is illustrated graphically in Chart 3, except that total expenditure rather than income is shown. Households in the lowest-expenditure class in all three samples had an average of roughly three persons apiece, whereas those in the highest classes were almost twice as large. Few households in urban Ghana rely on just one income earner. Not only will a man customarily work, but his wife as well; of the women 15 years and older enumerated in the Kumasi population inquiry, 77 per cent were gainfully occupied—chiefly as "mammy traders"—as were 64 per cent of their number in Sekondi-Takoradi (*21*, p. 30; *19*, p. 34). But this is not all. The African concept of a household is such a broad one that it may encompass many adults, all of whom contribute to total receipts. As income rises, then, so often does the number of persons who must be housed, clothed, and fed. Thus it was in the samples. Though the range of total expenditures among the extreme classes covered varied between four- and sixfold, the differences on a per capita basis were much less pronounced. Here are the figures (in shillings per month: *20*, pp. 10–12; *21*, pp. 32–33; *19*, pp. 36–37):

Expenditure class	Accra	Kumasi	Sekondi-Takoradi
Total Expenditures per Household			
Lowest expenditure class	119	124	135
Highest expenditure class	675	628	521
Total Expenditures per Capita			
Lowest expenditure class	37	44	47
Highest expenditure class	111	103	88

But the tendency for an increase in incomes to be accompanied by a rise in the number of mouths to be fed only partially explains why food items commanded so constant a proportion of total expenditures. Also involved, as would be expected and as Chart 3 reveals, is that as income goes up so do per capita outlays for food. This was most strikingly evidenced in the data for Accra and Kumasi. There, per capita monthly food expenditures rose from about 25 shillings in the lowest-expenditure classes (where total domestic outlays amounted to about 40 shillings per person) to an average of about 60 shillings in the highest classes (total per capita expenditures of over 100 shillings), and even then showed no signs of having approached a ceiling. These figures suggest that the demand for food is highly income elastic; indeed a double-log regression fitted to the Accra data gives a per capita constant expenditure elasticity coefficient of .98, and for Kumasi .86. A somewhat different situation is reflected in the data for Sekondi-Takoradi. Though there again per capita food expenditures increased with income, they did so rather less sharply than in the other two samples; the double-log method gives an elasticity coefficient of .55. Closer examination of the data indicates this disparity chiefly mirrors a rather low income elasticity of

demand in Sekondi-Takoradi for fish products. Before discussing this point, however, it is desirable first to examine the surveys' findings with respect to the broad characteristics of the diets of Ghana's city dwellers.

Diet Composition

In their essential features, the diets of urban Ghanaians closely resemble those of other Middle African peoples (*28*, p. 3). As is true over virtually all of Middle Africa, most meals are built around a mass of stiff porridge or doughy paste made from one of a small number of the starchy-staple foods—the cereals, the starchy fruits, roots, and tubers—bits of which are dipped into a sauce or thin stew before being eaten. The porridge or paste will invariably supply the bulk of the meal's calories, whereas the sauce, in addition to adding flavor, will contribute most of the protein, fat, vitamins, and mineral content. Sauces may be made from a wide variety of edibles. In the forested regions of Ghana, palm nuts and palm oil are standard ingredients, as are, to mention but a few, dried fish, beef, snails, peanuts, peppers, tomatoes, and onions.

Some idea of the relative contributions of the various food groups to the diet is to be had from Table 5, a rather unwieldy (but instructively detailed) tabulation of per capita purchases among the households in Kumasi and Sekondi-Takoradi from which quantity data were obtained. Its more striking features are summarized below in percentage terms:

	Kumasi		Sekondi-Takoradi	
Food group	Calories	Protein	Calories	Protein
Starchy staples	70.2	32.4	63.5	30.7
Meat	7.2	25.8	4.8	14.9
Fish	3.3	23.9	5.6	36.5
Nuts, fats, and oils	11.4	6.4	21.1	13.0
Vegetables and pulses	3.6	8.3	1.4	2.6
Drink	.8	.2	.4	.2
Miscellaneous	3.5	3.0	3.2	2.1
Total	100.0	100.0	100.0	100.0

Among other things, the data suggest that roughly two-thirds of the calories in the typical diet in Sekondi-Takoradi are derived from the starchy staples, while in Kumasi even more—70 per cent—come from this source.

Diets dominated by the starchy staples are characteristic not only of Ghanaians and other Middle Africans, but of poorer peoples the world over.[18] This for a

[18] Some examples, as of 1934–38, from other low-income regions (*3*, pp. 214–15):

Country	Percentage of total calories derived from starchy staples
China	77
Philippines	73
India	69
Mexico	55
Brazil	50

By way of contrast, it is estimated that the starchy staples contributed only 32 per cent of the calories consumed in the United States during the same interval.

TABLE 5.—KUMASI AND SEKONDI-TAKORADI BUDGET SURVEY SAMPLES, 1955: AVERAGE DAILY PURCHASES OF FOODSTUFFS PER CAPITA, HOUSEHOLDS INTERVIEWED BY PERMANENT STAFF*

Foodstuff	Kumasi (120 Households)			Sekondi-Takoradi (96 Households)		
	Quantity (*grams*)	Calories	Protein (*grams*)	Quantity (*grams*)	Calories	Protein (*grams*)
Manioc and manioc products						
Fresh roots	222.2	243	2.0	418.8	456	3.8
Gari (meal)	13.5	46	.2	19.1	64	.3
Kokonte (dried roots)	62.6	212	.9	17.0	57	.2
Other[a]	4.9	10	–	3.4	7	–
Plantains	518.9	389	4.2	223.6	168	1.8
Yams	136.9	123	2.9	54.7	49	1.1
Maize and maize products[b]						
Kenky[c]	30.9	50	1.4	115.2	188	5.2
Dough[c]	21.4	43	1.0	24.7	49	1.1
Shelled maize	3.7	13	.3	11.8	42	1.1
Rice	28.2	101	2.1	31.0	111	2.3
Cocoyams	113.9	98	1.7	17.2	15	.3
Bread[d]	11.1	27	.8	18.8	47	1.4
Bananas[e]	13.7	9	.1	10.1	7	.1
Total starchy staples	*1,181.9*	*1,364*	*17.6*	*965.4*	*1,260*	*18.7*
Meat						
Fresh red meat	79.6	127	12.2	57.3	92	8.8
Canned red meat	1.6	4	.4	.3	1	.1
Poultry	1.1	1	.1	.3	–	–
Snails	20.4	8	1.3	4.6	2	.2
Fish						
Fresh fish	1.3	1	.2	17.6	12	2.2
Dried fish[f]	30.0	59	12.1	46.3	95	19.3
Canned fish	1.0	3	.2	.7	2	.2
Shellfish	2.6	2	.5	2.6	2	.5
Nuts						
Palm nuts	26.2	87	1.8	85.2	282	6.0
Other[g]	11.4	38	1.4	18.8	53	1.8
Fats and oils						
Palm oil[h]	6.9	52	–	5.0	44	–
Other vegetable oils[i]	5.6	37	.3	3.9	32	.1
Butter and margarine	.9	7	–	1.0	7	–
Vegetables						
Eggplant	42.9	8	.4	26.3	5	.3
Tomatoes	21.6	4	.2	21.5	4	.2
Onions	13.4	5	.2	13.1	5	.2
Peppers	18.0	4	.2	13.1	3	.1
Okra	9.7	3	.2	4.7	1	.1
Spinach	8.6	1	.2	6.1	1	.1

TABLE 5.—KUMASI AND SEKONDI-TAKORADI BUDGET SURVEY SAMPLES, 1955: AVERAGE DAILY PURCHASES OF FOODSTUFFS PER CAPITA, HOUSEHOLDS INTERVIEWED BY PERMANENT STAFF—(*Concluded*)*

Foodstuff	Kumasi (120 Households)			Sekondi-Takoradi (96 Households)		
	Quantity (*grams*)	Calories	Protein (*grams*)	Quantity (*grams*)	Calories	Protein (*grams*)
Pulses[j]	13.3	45	3.1	2.6	9	.6
Drink						
Beer	7.5	4	.1	5.5	3	.1
Palm wine	2.4	8	–	8.7	3	–
Soft drinks	1.2	1	–	4.7	2	–
Imported spirits	.6	2	–	.2	1	–
Miscellaneous						
Milk and milk products	14.9	29	1.4	14.0	26	1.3
Fruit[k]	13.8	6	.1	1.9	1	–
Sugar[l]	11.3	31	–	14.5	35	–
Salt	18.3	–	–	18.0	–	–
Eggs	1.1	2	.1	.3	–	–
Other[m]	.9	–	–	3.4	1	–
Total foodstuffs[n]	*1,570.0*	*1,943*	*54.3*	*1,367.6*	*1,984*	*60.9*

* Based on data in Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), pp. 48–49, and *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), pp. 44–45. Caloric and protein values computed by using conversion factors given in FAO, *Food Composition Tables—Minerals and Vitamins—For International Use* (Nutr. Studies 11, Rome, 1954), pp. 10–27; B. S. Platt, *Tables of Representative Values of Foods Commonly Used in Tropical Countries* (Gr. Brit., Medical Research Council Special Report 253, London, 1945), pp. 10–34; and Lucius Nicholls, *Tropical Nutrition and Dietetics* (3d ed., London, 1951), pp. 424–26, except in the case of palm nuts, for which values were derived by assuming 25 per cent waste and an oil content of the remainder of 50 per cent. Where quantities were given in terms of bottles rather than weights, the following bottle sizes were assumed: vegetable oils—half an Imperial gallon; beer, palm wine, and soft drinks—12 fluid ounces; imported spirits—one-fifth gallon.

[a] Dough and krako.

[b] Chiefly maize, but apparently also includes millets and sorghums.

[c] Calories and protein computed assuming kenkey (fermented dough balls) is 55 per cent water, dough 45 per cent water, as reported in Faye W. Grant, "Nutrition and Health of Gold Coast Children," *J. Am. Diet. Assn.*, July 1955, pp. 690–91.

[d] Includes biscuits and *togbei* (dough cakes).

[e] Bananas are not technically starchy staples, but as they are often prepared in the same way as plantains, they are included here as such.

[f] Includes smoked and fried fish.

[g] Coconuts, peanuts, tiger nuts, and kola nuts.

[h] Both palm-nut and palm-kernel oil.

[i] Coconut oil, peanut oil, and shea butter.

[j] Chiefly peas and beans.

[k] Oranges, limes, guavas, papayas, avocados, mangoes, and pineapples.

[l] Includes sugar cane.

[m] Coffee, tea, etc., and unspecified foodstuffs.

[n] Figures do not include allowances for meals taken out or snacks purchased away from home during the day.

very simple reason—their cheapness, whether expressed in terms of market price or production cost. As a general rule, less land and less labor expense are required to produce a thousand calories of energy value in the form of starchy staples than in the form of other foodstuffs. In southern Ghana, as Table 6 brings out, they are rivaled in this regard only by the oil palm. In Sekondi-Takoradi and Kumasi,

TABLE 6.—KUMASI (MARCH–APRIL 1955) AND SEKONDI-TAKORADI (FEBRUARY–MARCH 1955): AVERAGE RETAIL PRICES OF SELECTED FOODSTUFFS*

Foodstuff	Pence per thousand calories		Pence per kilogram	
	Kumasi	Sekondi-Takoradi	Kumasi	Sekondi-Takoradi
Manioc and manioc products				
Kokonte	1.37	2.26	4.63	7.66
Fresh roots	2.25	2.29	2.45	2.50
Gari	2.47	2.71	8.35	9.17
Maize and maize products				
Shelled maize	1.82	2.55	6.48	9.07
Kenkey	4.82	4.48	7.86	7.31
Plantains (fresh)	2.56	3.63	1.92	2.72
Palm nuts	2.90	1.34	9.60	4.45
Cocoyams	3.16	4.22	2.72	3.63
Rice (raw)	4.37	4.44	15.61	15.86
Yams	4.97	6.42	4.47	5.78
Bread	9.26	9.83	23.35	24.78
Smoked fish	26.19	24.11	53.42	49.19
Red meat (cheaper cuts)	28.94	22.29	46.31	35.67
Eggplant	39.70	50.45	7.94	10.09
Tomatoes	109.79	165.00	20.86	31.35

* Based on data in Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), p. 48; *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), p. 44; caloric values calculated using conversion factors given in the sources cited in the footnote to Table 5.

during the periods covered by the surveys, such other foodstuffs as meat, fish, and vegetables cost consumers between 10 and 50 times as much per calorie as did the principle starchy staples.

But if the diets of urban Ghanaians are those of poor people, it does not necessarily follow that they are poor diets. In Kumasi (see Table 5), recorded purchases per person amounted to the equivalent of 1,943 calories and 54 grams of protein daily, while for Sekondi-Takoradi the figures were 1,984 and 61. These totals, it should be noted, almost certainly understate actual consumption: estimated caloric and protein content were computed using the most conservative conversion factors, and meals and snacks taken away from home are excluded. They may understate actual intake by as much as from two to four hundred calories. But even at face value, they clearly point to a dietary which, at least in so far as protein and calories are concerned, is more than adequate. If, using the Oxford Scale, they are converted from a per capita to an adult-equivalent basis, the following picture emerges:[14]

City	Average daily intake per adult equivalent	
	Calories	Protein (*grams*)
Kumasi	2,841	79.4
Sekondi-Takoradi	2,841	87.3

[14] On the Oxford Scale of adult equivalents, the household head counts as one unit, other adults and children of 14 and over as .7 unit, and children under 14 as .5 unit (*41*, p. 7). Here, because of the age breakdown available, children under 15 have been taken as .5 unit.

Using the subsequently reduced 1948 recommendations of the Food and Nutrition Board as the basis for his calculations, Dr. Lucius Nicholls has suggested the following daily allowances for a 121-pound man living in the tropics (*31*, p. 315):[15]

Nature of work	Calories	Protein (*grams*)
Sedentary	2,100	60
Active	2,500	65
Very active	3,000	70

Though most meals follow day after day on the same broad plan, and are built around a limited number of staple foods, variety in the diet is not totally wanting. Not only does the sauce offer a great range for variation; the staple itself may be prepared in a number of ways. Although plantains, manioc, yams, and cocoyams are often merely peeled, boiled, and mashed before being served, the most common procedure is for the staple to be pounded into a flour or meal prior to cooking. With the cereals this involves either a grinding stone or a mortar and pestle; with the roots and tubers, slicing, drying, and sometimes cooking are also needed. Minor variations at this stage may result in totally different products. Manioc flour, for instance, is made by pounding roots which have been split and sun dried (*kokonte*), while the preparation of manioc meal (*gari*), altogether another thing, differs mainly in that, before drying, the roots are first grated and pressed (*28*, pp. 112–13). Once the flour or meal has been readied, many alternatives offer themselves. Simply by varying the amount of water that is added, for example, thin gruels as well as thicker porridges or pastes may be concocted. A Ghanaian cook book offers a comparatively wide range of dishes which may be prepared from a restricted number of staple ingredients.[16]

The brevity of the list of staple foods on which urban Ghanaians rely for the bulk of their calories is readily evident in Table 5. In Sekondi-Takoradi, just four crops—manioc, maize, plantains, and rice—supplied over 90 per cent of the calories derived from the starchy staples, while manioc and maize alone contributed almost 70 per cent. Much the same situation obtained in Kumasi, though as would be expected in view of its setting, the relative importance of the several crops was somewhat different. There, manioc and plantains were the chief calorie sources, together contributing two-thirds of those supplied by the staple foods, while yams, maize, rice, and cocoyams accounted for the bulk of the remainder. These figures must, of course, be taken with certain reservations; they relate to periods of only 30 days duration, and, as is shown later on, the relative contributions of the several staples change seasonally with local price and supply conditions. They are, however, indicative of a situation which prevails throughout the year.

[15] As this study went to press, an unpublished manuscript by Miss Pauline Whitby of the Medical Research Institute, Accra, was brought to my attention. In this manuscript, entitled "Calculations of Food Consumption and Nutrient Intake in Five Areas of Ghana," Miss Whitby offers some interesting estimates of the "normal" per capita caloric requirements of the populations of Kumasi and Sekondi-Takoradi. Using the standards set forth in the 1957 FAO *Report on Caloric Requirements*, these she put at 2,050 and 2,230 calories per day. Given the extent to which the survey data understate actual consumption, Miss Whitby's estimates offer further confirmation of the over-all adequacy of the caloric intakes suggested.

[16] For detailed descriptions of many common Ghanaian dishes and the methods of their preparation, see *24*, pp. 687–88 and *17*.

But restricted though the list of staples normally purchased by Ghana's urban dwellers may be, there is reason to believe that, because of their generally higher incomes, they consume a slightly greater variety than the rural population. This conclusion is suggested by Table 7, in which the findings of the Kumasi and

TABLE 7.—GHANA: RELATIVE CONTRIBUTIONS OF THE VARIOUS STARCHY STAPLES TO THE DIET IN KUMASI (1955), SEKONDI-TAKORADI (1955), SOUTH-EAST AKIM ABUAKWA (1952/53), AND THE ODA-SWEDRU-ASAMANKESE REGION (1955)*

Item	Urban		Rural	
	Kumasi	Sekondi-Takoradi	South-East Akim Abuakwa	Oda-Swedru-Asamankese
Per Cent of Total Calories from Starchy Staples				
Manioc and manioc products.	37.5	46.3	50.4	41.5
Fresh roots	*17.8*	*36.2*	....	*40.8*
Processed items	*19.7*	*10.1*	....	.7
Plantains and bananas	29.2	13.9	17.7	29.6
Yams	9.0	3.9	2.2	2.9
Maize and maize products	7.8	22.1	5.6	7.7
Rice	7.4	8.8	—	1.2
Cocoyams	7.2	1.2	24.1	15.7
Bread	1.9	3.8	—	1.4
Total	100.0	100.0	100.0	100.0
Total Calories from Starchy Staples				
Per person per day	1,364	1,260	1,435	1,312
Sample Characteristics				
Number of households	120	96	832	1,080
Period covered	30 days (Mar.–Apr.)	30 days (Feb.–Mar.)	12 months (June–May)	3 months (Oct.–Dec.)

* Based on data in Table 5; and Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *Agricultural Statistical Survey of South-East Akim Abuakwa, 1952–53* (No. 1, September 1953), p. 10; and *Survey of Population and Budgets of Cocoa Producing Families in the Oda-Swedru-Asamankese Area, 1955–1956* (No. 6, July 1958), pp. 91, 98; caloric values calculated using conversion factors given in the sources cited in the footnote to Table 5.

Sekondi-Takoradi surveys are compared with those of similar investigations conducted about the same time in two rural areas—South-East Akim Abuakwa, extending northward from Nsawam for about 25 miles; and the Oda-Swedru-Asamankese region, similarly situated with respect to the town of Swedru. Though both of these areas are located in the Forest, Ghana's richest and most diversified agricultural region, in neither do we find quite the variety of staples observed in the cities, chiefly because neither rice nor bread was consumed to any appreciable extent. Both these items, it should be noted, are comparatively expensive and (though rice is grown in some parts of the Forest) imported.

That the surveys cited in Table 7 should point up manioc, a root crop, as the pre-eminent staple in urban as well as rural diets in southern Ghana warrants

a word of explanation. As a general rule, the starchy roots and tubers grown in Middle Africa do not lend themselves readily to commercialization. The cereals, concentrated and relatively imperishable, can be transported from place to place at little cost. Most of the roots and tubers cannot be. Though cheaply produced in humid regions, because of their bulky and semi-perishable nature, they tend quickly to lose their price advantage if moved any great distance. Thus, while cocoyams figured importantly in the diets of peasants in the South-East Akim Abuakwa and Oda-Swedru-Asamankese regions, they were too costly to do so in Kumasi and Sekondi-Takoradi.

Manioc, however, is a singularly versatile commodity. Unlike the other roots and tubers, it need not move to market in fresh form. Quite commonly, especially if the distance to market is great, it is processed into kokonte or gari before leaving the farm. Both of these products compare favorably with the cereals in price and caloric value per pound, and in addition have good storage qualities. They are, moreover, not without appeal to bachelors and other busy urban consumers because both products are virtually ready to eat; with gari, one need merely add water. Still other features commend manioc to a prime role in urban provisionment. The least demanding of the staples with respect to soil requirements, it may be grown on land too poor to support cropping of any other kind; accordingly it is admirably suited to the overworked land surrounding the cities. Then too, it is a reliable year-round source of calories. Because its roots may be left in the ground for as many as 24 months after reaching maturity they need be harvested only when required (*28, passim*).

The contribution the various foodstuffs make to the diet is, of course, only weakly related to the position they occupy in the food budget. Thus, while manioc and the other starchy staples easily make up the most important group of foods consumed in Ghana's cities in terms of calories, their cheapness makes their significance from the point of view of expenditures appreciably less (*20,* pp. 22–23; *21,* pp. 44–45; *19,* pp. 48–49). This is clear from the following tabulation:

	Percentage of expenditures on food and drink		
Food group	Accra	Kumasi	Sekondi-Takoradi
Meat and fish	34	42	36
Starchy staples	35	28	32
Vegetables and pulses	9	12	12
Nuts, fats, and oils	5	7	8
Drink	6	4	5
Miscellaneous	11	7	7
Total	100	100	100

In terms of percentage of expenditures on food and drink, meat and fish tend to stand in the premier position; during the survey periods these two items together accounted for between 34 and 42 per cent of all outlays for food and drink. True, expenditures on the starchy staples were almost as great; still their secondary role is clear. Compared with these two groups, outlays for other foodstuffs were minor. The various nuts, fats, and oils, the second-ranking source

of calories, commanded but 5 to 8 per cent of expenditures, and the vegetables and pulses only slightly more. Drink and miscellaneous items accounted for the small remainder. These figures, of course, are averages for all income groups; surprisingly enough, however, the general magnitudes to which they point persist with remarkable constancy throughout the entire observed range of incomes.

Dietary Changes with Income

That the broad pattern of food expenditures changes little with income is one of the most striking revelations of the three surveys. So common among budget investigations conducted in Western countries is the finding that a rise in income is accompanied by a decline in relative expenditures on the cheaper foodstuffs (particularly the starchy staples) and by an increase in those for the more expensive commodities (most notably meat products), that the relationship has come to be treated as virtually axiomatic. Not so in urban Ghana, or at least not so over the range of incomes for which we have data. As Chart 4 brings out, the proportion of expenditures given over to the various commodity groups was for all practical purposes completely independent of total food outlays. Whether in Accra and Kumasi, where per capita food expenditures rose sharply with income, or in Sekondi-Takoradi, where they did not, the findings were the same: in the highest-expenditure classes as well as the lowest, the starchy staples, meat and fish, and the residual group of other foods each accounted for about a third of the total food budget.

It follows from this that the income elasticities of demand suggested by the surveys were much the same for all of the major food groups (*20*, p. 14; *21*, p. 38; *19*, p. 42):

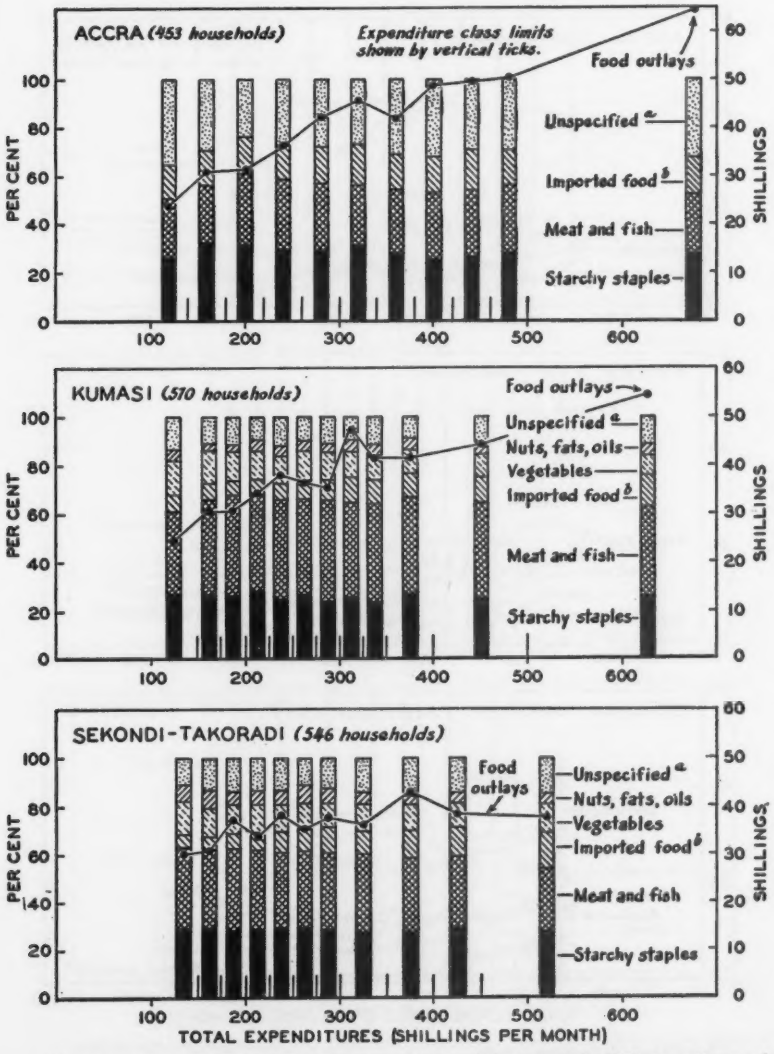
Food group	"Income" elasticity of demand[a]		
	Accra	Kumasi	Sekondi-Takoradi
Principal starchy staples	.89	.82	.77
Principal meat products	.92	.72	.80
Principal fish products	.82	.68	.35

[a] On a per capita basis. Computed by the double-log method, total expenditures rather than income having been used as the regressor.

In fact, the foregoing tabulation points to a demand for meat and fish which is no more income elastic (indeed perhaps a bit less) than the demand for starchy staples. This is exceptionally noteworthy. It is a widely held supposition that most Middle Africans have a strong craving for animal proteins which low income prevents them from satisfying. That the immediate extent of this desire may well be overestimated is implicit in our findings.

It also follows, given the over-all rigidity in the pattern of food expenditures, that most of the dietary changes which accompany rises in income are the replacement of cheaper and less preferred products by more highly regarded ones in the same commodity grouping. This is borne out by the data presented in Charts 5A and B, though it must be noted that with respect to the starchy staples the survey's findings on this point are rather less conclusive than might have been expected. (The heterogeneous character of Ghana's urban population prob-

CHART 4.—GHANA, URBAN HOUSEHOLD BUDGET SURVEY SAMPLES, 1953 AND 1955: PERCENTAGE BREAKDOWN OF FOOD EXPENDITURES, AND THE PER CAPITA MONTHLY FOOD OUTLAYS, BY EXPENDITURE CLASS*

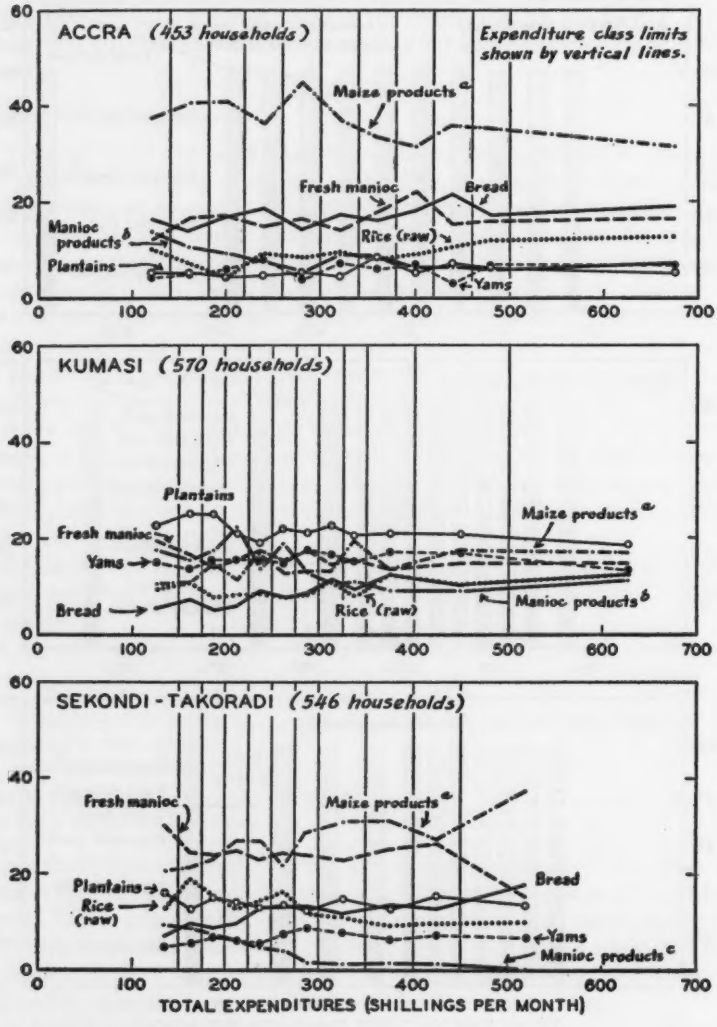


* Based on data in Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *1953 Accra Survey of Household Budgets* (No. 2, December 1953), pp. 10–14; *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), pp. 36, 37, 42; *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), pp. 32, 33, 38. Positioning of data for extreme expenditure classes reflects actual average expenditures; for other classes the midpoint. Figures do not include expenditures on drink.

[a] A residual figure. In addition to such truly unspecified items as snacks purchased away from home, it includes expenditures for the less important starchy staples, meat and fish items, vegetables, and nuts, fats, and oils. (For Accra, of course, it includes all outlays for items in the latter two groupings.) It is best thought of as being prorated among the major commodity groups.

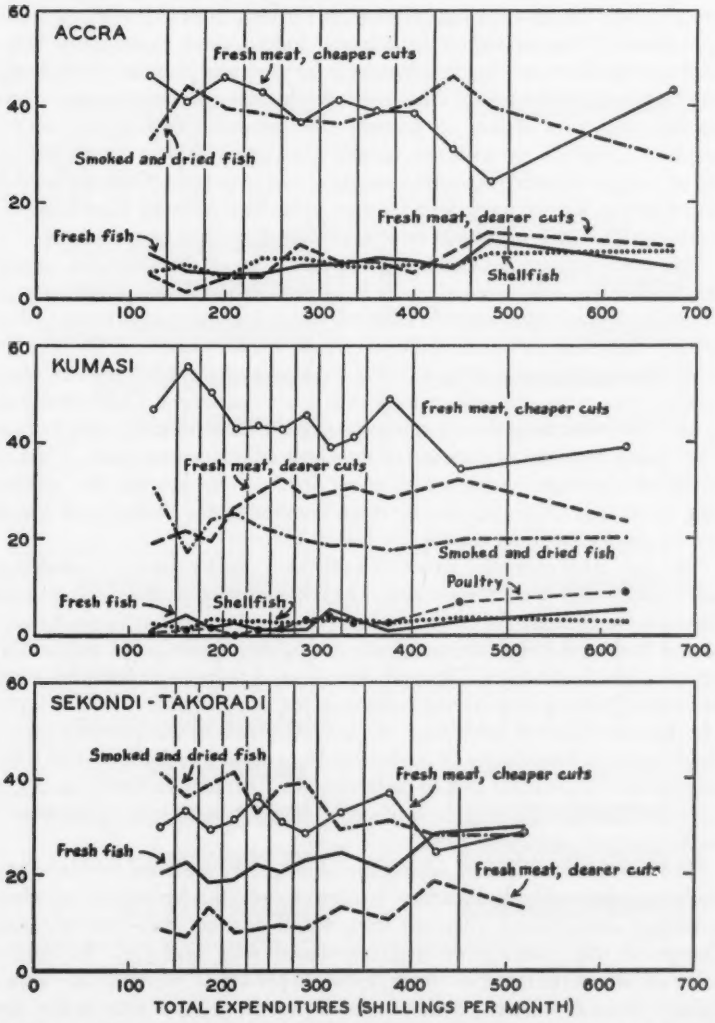
[b] Packaged imported items. It includes such things as sugar and canned meat and milk, but not wheat flour and the like.

CHART 5A.—GHANA, URBAN HOUSEHOLD BUDGET SURVEY SAMPLES, 1953 AND 1955: EXPENDITURES FOR SELECTED STARCHY STAPLES AS A PERCENTAGE OF TOTAL OUTLAYS FOR THESE ITEMS, BY EXPENDITURE CLASS*



* See source note on opposite page.
[a] Kenkey and dough.
[b] Gari and kokonte.
[c] Kokonte.

CHART 5B.—GHANA, URBAN HOUSEHOLD BUDGET SURVEY SAMPLES, 1953 AND 1955: EXPENDITURES FOR SELECTED MEAT AND FISH PRODUCTS AS A PERCENTAGE OF TOTAL OUTLAYS FOR THESE ITEMS, BY EXPENDITURE CLASS*



* Based on data in Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *1953 Accra Survey of Household Budgets* (No. 2, December 1953), p. 14; *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), p. 42; *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), p. 38. Positioning of data for extreme expenditure classes reflects actual average expenditures; for other classes the mid-point.

ably accounts for this result. With traditional food preferences differing from one tribal group to the next, it may well be that some of the less significant movements tended to cancel one another.) Thus, at first glance it is difficult to perceive in Chart 5A any clear-cut correlations between income levels and relative expenditures on the individual staple foods. Indeed, closer examination fails to reveal any significant tendencies whatsoever for yams and plantains, both thought to be highly esteemed by most Ghanaians; while relative outlays for maize products increased with income in Kumasi and Sekondi-Takoradi, but declined sharply in Accra. So too with rice, another comparatively dear commodity considered to enjoy a preferred position among urban consumers. Only in Accra did relative outlays for rice go up with income; in Kumasi no trend is evident, while in Sekondi-Takoradi expenditures actually fell off.

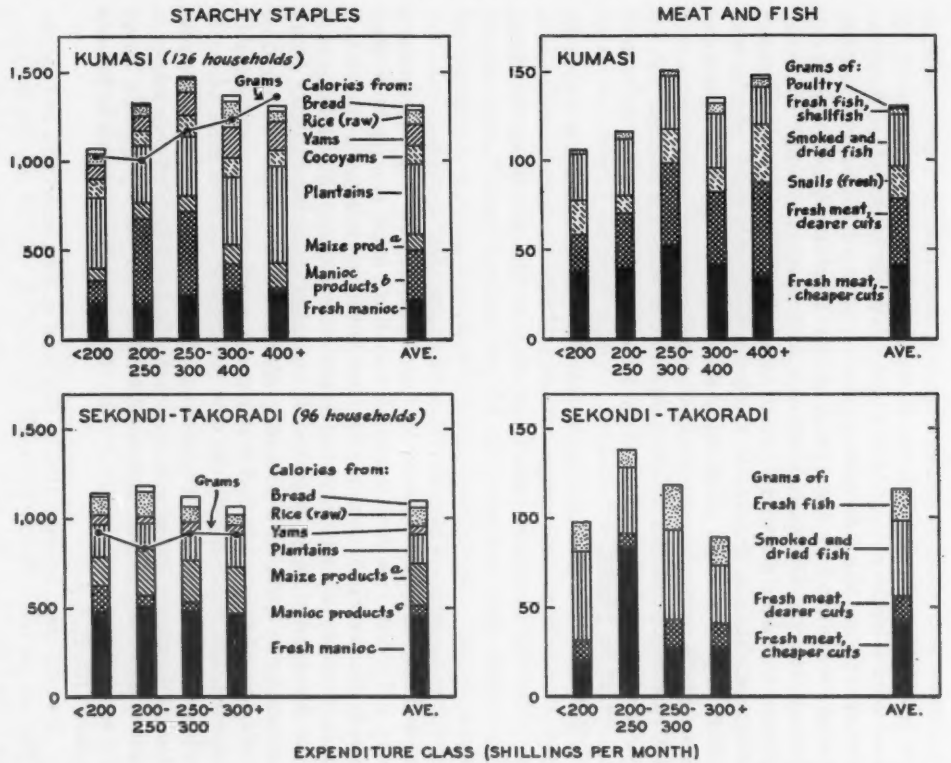
Still, two consistent tendencies are discernible. In all three samples, expenditures for bread rose significantly with income. The trend was particularly pronounced in Kumasi and Sekondi-Takoradi; there, income elasticities of 2.03 and 1.74 are suggested, as against 1.01 for Accra.[17] This preference for bread, by far the most expensive starchy staple in terms of cost per 1,000 calories, almost certainly mirrors the convenience it offers to urban consumers. Chiefly purchased for meals to be eaten on the job at lunch time, it is easier to carry, simpler to eat, and probably better liked than any of the prepared indigenous foods. Then too, considerable prestige is attached to eating bread; it has become the "modern" thing to do, and Ghanaians are no more immune to the challenge of keeping up with the Joneses than anyone else (*26,* p. 14).

The only other consistent correlation relates to the dry manioc products, gari and kokonte, and is an inverse one. Outlays for these products (in Sekondi-Takoradi the data are for kokonte alone) declined sharply as income rose, to the end that in the highest-expenditure classes they commanded only a trivial portion of the food budget. This apparent aversion to gari and kokonte (despite their ease of preparation) is most important, for, as noted above, manioc is probably the one foodstuff best suited to play a key role in the provisionment of Ghana's cities. Accordingly, it is almost with a sense of relief that one fails to find evidence of a similar lack of preference for fresh manioc roots. In fact, the Accra and Kumasi data suggest a tendency for fresh roots to be substituted for the dry products as income rises.

The extent of the dietary adjustments brought on by these two income-expenditure relationships is illustrated in Chart 6 (which relates to the subsamples in Kumasi and Sekondi-Takoradi from which quantity data were obtained). Changes in the quantities of bread purchased were negligible. In Sekondi-Takoradi, where the trend is clearest, apparent per capita consumption rose only slightly—from 25 calories per day in the lowest-expenditure class to but about double that amount in the highest. This, of course, reflects the costliness of bread; rather substantial changes in expenditures are needed to appreciably alter the quantity consumed. The opposite is true for gari and kokonte. Among the

[17] These elasticity figures have only limited significance. Much of the bread consumed in Ghana never reaches the home, but is purchased for snacks or for lunches on the job, and escaped inclusion in the bread item in the surveys. A comparison of flour import data with the bread quantity figures reported for Kumasi and Sekondi-Takoradi reveals a sharp discrepancy (*26,* pp. 10–11).

CHART 6.—KUMASI AND SEKONDI-TAKORADI BUDGET SURVEY SAMPLES, 1955, HOUSEHOLDS INTERVIEWED BY PERMANENT STAFF: PER CAPITA DAILY PURCHASES OF SELECTED STARCHY STAPLES AND MEAT AND FISH PRODUCTS, BY EXPENDITURE CLASS*



* Based on data in Gold Coast, Off. Govt. Stat. (Stat. and Econ. Papers), *Kumasi Survey of Population and Household Budgets, 1955* (No. 5, March 1956), p. 44; *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (No. 4, March 1956), p. 40; caloric values calculated using conversion factors given in the sources cited in the footnote to Table 5. Because data relate to principal foodstuffs only, average figures do not add to totals given in Table 5.

[a] Kenkey and dough. [b] Gari and kokonte. [c] Kokonte.

cheapest sources of calories available in the city markets, a modest shift in expenditures for them results in large quantity differences. We may conclude, then, that the only truly significant adjustment in the staple dietary of Ghana's urban dwellers that can consistently be expected to accompany a rise in income is for consumption of the dry manioc products to decline.

Chart 6 is revealing in another respect: it sheds light on a question which has provoked a good deal of discussion among economists interested in Ghana. In a series of articles published a few years ago in the journal of the Economic Society of Ghana, Miss Polly Hill remarked on some of the findings of the urban budget surveys which she found puzzling (*25*). Chief among these was the suggestion, evident at first glance in the data for Kumasi and Akuse,[18] that rising incomes were associated with a marked increase in the quantity of staple foods consumed. Thus, in Kumasi, she noted that households which spent in total 400 shillings or more per month on all their domestic requirements, purchased around 1,350 grams of the starchy staples daily per person, as opposed to about 1,000 grams in households with total expenditures below 250 shillings. This apparent tendency to eat "more in bulk the richer one gets" she termed the "cassava law"[19] (*25*, Pt. 2, p. 6).

Unable to believe the "law" was actually true—for it implied that in even the highest-expenditure classes people behaved as if they were getting insufficient to eat—Miss Hill attempted to offer an explanation. This she succeeded in doing, quite convincingly, in terms of the African "extended family" system and the almost obligatory hospitality it entails. Where the traditional customs are still preserved, the canons of hospitality dictate that a man feed any of his or his wife's myriad relatives who happen to visit him, no matter how long they choose to stay, and generally too those individuals who chance to call near mealtime. Reasoning that this "family parasitism" applied particularly in urban areas, to which a steady stream of single men come to seek their fortunes, Miss Hill suggested that the apparent rise in staple-food consumption could most logically be accounted for by increasing kinship obligations; as a man's income went up, more and more relatives would find it convenient to call—a better meal would be expected. The implications of this were far reaching. In Miss Hill's words, "if it [the 'cassava law'] is to be explained in terms of gifts and hospitality, then the fears of the economists and sociologists are indeed well founded—our urban . . . society is such that only the exceptional man, the man who is prepared to ignore his social obligations and civilities to his fellows, can better himself by his own efforts" (*25*, Pt. 3, p. 7).

It would seem, however, that on this point at least, economists and sociologists can rest easy. Though admirably reasoned, the analysis contains one error, and it is a fatal one. For while it is undeniably true that the total quantity of staple foods purchased per person increased with income in Kumasi (and in Akuse), apparent per capita consumption expressed in terms of calories exhibited no such tendency. In fact, a glance at Chart 6 reveals that, after having increased somewhat in the lowest-expenditure classes, apparent per capita intake of calories derived from the starchy staples actually declined in the highest two.

[18] For reasons noted above the Akuse survey is not considered in this study.
[19] In the former British West African Territories, manioc is generally called cassava.

(Worth noting is the general constancy of the calorie figure throughout the entire range of incomes sampled in Sekondi-Takoradi). There is, of course, no conflict. All that happened was that as income rose, the dry manioc products were increasingly supplanted in the diet by the bulkier staples (chiefly plantains and yams),[20] thereby on a weight basis creating the impression of greater consumption. Exit, then, the "cassava law" and all its discomforting corollaries: they rest on an illusion.

Miss Hill also expressed puzzlement over the trends in meat and fish consumption evidenced in the surveys. In this connection, it can only be reiterated that the data fail to bear out the supposition that a rise in income is accompanied by a sharp upturn in consumption of animal proteins. In Kumasi a rising trend was evident, but it could hardly be considered the "strong consistent upward" movement for which Miss Hill was looking; while in Sekondi-Takoradi apparent intake in terms of grams was actually less in the highest-expenditure class than in the lowest. This last is indeed surprising and, other than pointing out that quantity data by expenditure class are available only for selected principal foodstuffs and that in Sekondi-Takoradi particularly, Chart 6 does not include figures for many of the more expensive products, I will make no attempt to account for it. A thesis by Miss M. Crossley is perhaps worth noting, however (*9*, p. 15). Observing that apparent meat and fish consumption tended to be highest among households with incomes in the middle range of those sampled, she has suggested that this might reflect some sort of "natural expression of the need" for certain persons to eat more of the protein-rich foods than others—her not unreasonable assumption having been that people with incomes in the middle range were chiefly manual laborers, as opposed to clerical employees in the higher brackets.

But apart from this seemingly anomalous behavior in Sekondi-Takoradi, there appears little basis for puzzlement. The data merely emphasize what has already been stressed—that throughout the entire range of incomes observed, the over-all dietary pattern changed little, meat and fish being no exceptions. The consumer, according to his own particular likes and dislikes, improves his diet as his income rises, but apparently feels no compulsion to alter its general composition. Whether this behavior carries over into the highest-income brackets is, of course, quite another matter. It may, or it may not; we simply do not know.[21] And, until additional and more representative investigations are carried out, it would be a mistake to speculate.

SUPPLY CHARACTERISTICS

The system through which foodstuffs flow into Ghana's cities is at the same time both simple and involved: simple because most commodities reach the consumer in exactly the same form as they leave the farm; involved because a given item commonly passes through several markets and through the hands of many intermediaries before arriving at it final destination.

[20] The tendency for gari and kokonte consumption to decline with income is also evident in the data for Akuse. See *28*, p. 201.

[21] It is interesting to note, however, that in their recent study of the elite in Nigeria, Hugh and Mabel Smythe found that "food has little relevance to social status." "The elite," they go on to say, "may be able to afford a finer cuisine than the rest of the population, but they usually adhere to the standard dietary pattern" (*39*, p. 145).

The Market Chain

The shop and the shopkeeper, as known in Western societies, play only a minor role in the economic life of Ghana. Instead, internal trade is conducted almost entirely through local markets. In the larger towns and cities these markets are vast, relatively elaborate affairs, attended by many thousands of persons[22] and extending over several blocks. In the countryside they are far less pretentious. The typical rural market occupies no more than an acre or two in the middle of a village or in a clearing between villages, and is equipped with few amenities save some flimsy lean-tos. In Ghana, where markets are indigenous and highly developed, most people live within a few miles of several such sites, and on market days they flock there to visit, court, and enjoy themselves as well as to trade.

These small rural markets serve as places for exchange both between local farmers and between farmers and traders who purchase for resale in the towns and cities. As feeder markets they are related to one another and to the country's consuming centers through what have been called "market circles." The name reflects the fact that most farm people think of themselves not as being served by just one market, but as being near the hub of four or more, each of which is held on a different day. These circles generally overlap, so that most markets belong to several. The result is that the countryside is crisscrossed by a sort of chain mail of circles, making it possible for goods to move appreciable distances, while allowing those who trade in them to remain comparatively close to home.

Usually within each circle or series of circles there is at least one major market. These larger country markets, now invariably reached by a road of some type, form the funnels of the exchange system, channeling processed goods to their satellite markets and acting as collecting centers for foodstuffs destined for the cities. Such a bulking point is the market at Asesewa, located some 60 miles north of Accra in the heart of an important maize-producing region. Here, on Mondays and Fridays, a vast multitude assembles, including an average of about 4,000 persons—local growers as well as intermediaries who have bought in outlying markets—selling only foodstuffs. Trading with them are bulk buyers who come with empty trucks from all parts of the country (but especially Accra) and who ship directly to the cities. It is estimated that a minimum of 150 trucks visit Asesewa on market days and that (because those traveling short distances make several trips each day) the number of daily departures averages about 800 (*29*, pp. 38–41).

Once the trucks reach the cities, the loads which have been so laboriously assembled are quickly broken down. Generally this bulk-breaking process is carried out by a further series of intermediaries, each one dealing in smaller lots, until the retail stall-keeper or hawker will offer for sale no more than a few piles of the commodities in which she trades. The upshot is that by the time an item is purchased by the urban consumer it has passed through at least three markets and been handled by perhaps a half-dozen intermediaries; and it is by no means unusual for double those numbers to have been involved.

This trade in foodstuffs is managed entirely by Africans. In Ghana, as in

[22] Of sellers alone, Accra's 11 markets count well over 25,000 (*34*, p. 7).

most other countries of western tropical Africa, an energetic group of traders has grown up, its members handling all stages of food collection and distribution. This class has long existed; but, encouraged by the trend toward urbanization and the concomitant expansion in the road network and cash cropping, it has grown greatly in size and affluence since the war. Today, the speeding trucks of African entrepreneurs are a characteristic feature of the Ghanaian scene, each one representing a major investment of hard-won savings, and each one attesting to the enterprise, if not the skill, of a new commercial élite.

Surprisingly enough to the outsider, the greater part of the food trade is conducted by women. With few exceptions—livestock products are the most significant—they dominate all of its aspects. It is the farmer's wife, not the farmer, who walks up to five or ten miles each day to market a headload; it is the "mammy trader" who assembles these small lots and sends them to town; it is she who prevails in the great city markets; and more often than not it is to one of her more prosperous sisters that the fancifully decorated truck—"mammy wagon" is not a misnomer—will belong. How women came to control this crucial sector of the economy is not altogether certain, though it doubtless in part reflects a legacy from a time (not so many years ago) when only women could venture far from their villages with impunity. But be that as it may, it is the women who now dominate the market place. "The market mammies occupy a very important position in this semi-capitalistic society of ours," President Nkrumah has been quoted as saying (*35*, p. 139). If anything, he is guilty of an understatement.

This indigenous system of urban provisionment is a source of considerable pride to Ghanaians, and justifiably so. Nonetheless, it has not been free of criticism (cf. *35*, p. 53; *7*, pp. 22-23). Not a few observers have contended that because the system lacks the centralized direction and the greater capitalization which the European firms and marketing boards dealing in export crops can bring to bear, it has been rather less effective than these entities in calling forth production. Also, because of the lengthy chain of intermediaries involved, some have argued that the system fosters unduly large differentials between producer and consumer prices.

As to the second of these criticisms, it may be noted that the number of its supporters has fallen off sharply within the last decade. For while the system is undeniably primitive from a technological point of view, as P. T. Bauer has emphasized at length (*2*), its heavy reliance on labor inputs is admirably suited to the present state of Ghana's economy. "So far from being wasteful," in his words, "it is highly economic in saving and salvaging those resources which are particularly scarce in West Africa (above all, real capital) by using those resources . . . [i.e., labor] for which there is very little demand. . . ." (*2*, p. 22). Increasingly it has come to be accepted that the large number and long line of intermediaries must find ample justification in the economies to be obtained from bulking and later breaking tens of thousands of tiny lots; otherwise they would have long since been bypassed.

More serious is the contention that the system is cumbersome and sluggish, that it fails to elicit from food producers the same response as do the more centralized and sophisticated buying organizations which purchase export crops. Here, regrettably, most of the argument on either side has lacked solid support

in empirical fact—and for good reason. Unlike the export trade, there has been for food movements an extreme paucity of data. Few are the sources to be tapped: hardly any of the thousands of traders keep records—even those who can read and write—and because most movements are internal, customs figures are of little value. Moreover, it has not been until the last few years that the trade has posed any serious problems for government administrators; few of them, accordingly, have felt any particular compulsion to encourage study of it.

Fortunately, a truly major step was recently taken toward correcting this state of affairs. This was a year-long census of produce movements conducted in 1957 and 1958 by the Office of the Government Statistician. Thanks to this census it is now for the first time possible to build up a reasonably complete picture of the sources and quantities of the foodstuffs which flow into one of Ghana's cities. It is also possible to infer something about the efficiency of the system through which they move. Strongly suggested is that the system permits both flexibility and regional specialization among supply areas, with the outflows from these areas changing over smoothly and efficiently from one season to the next.

The 1957/58 Produce Movement Census

Despite the fact that the census of 1957/58 yielded the first really serviceable results, the collection of food-movement statistics in Ghana has, by Middle African standards, a comparatively long history. Since as early as 1929 records have been kept of shipments passing over some of the Volta River ferries. In addition, on several occasions during the early 1950's both the Office of the Government Statistician and the Economic Research Division of the University College conducted brief traffic checks in the neighborhood of some of the larger towns and cities.[23]

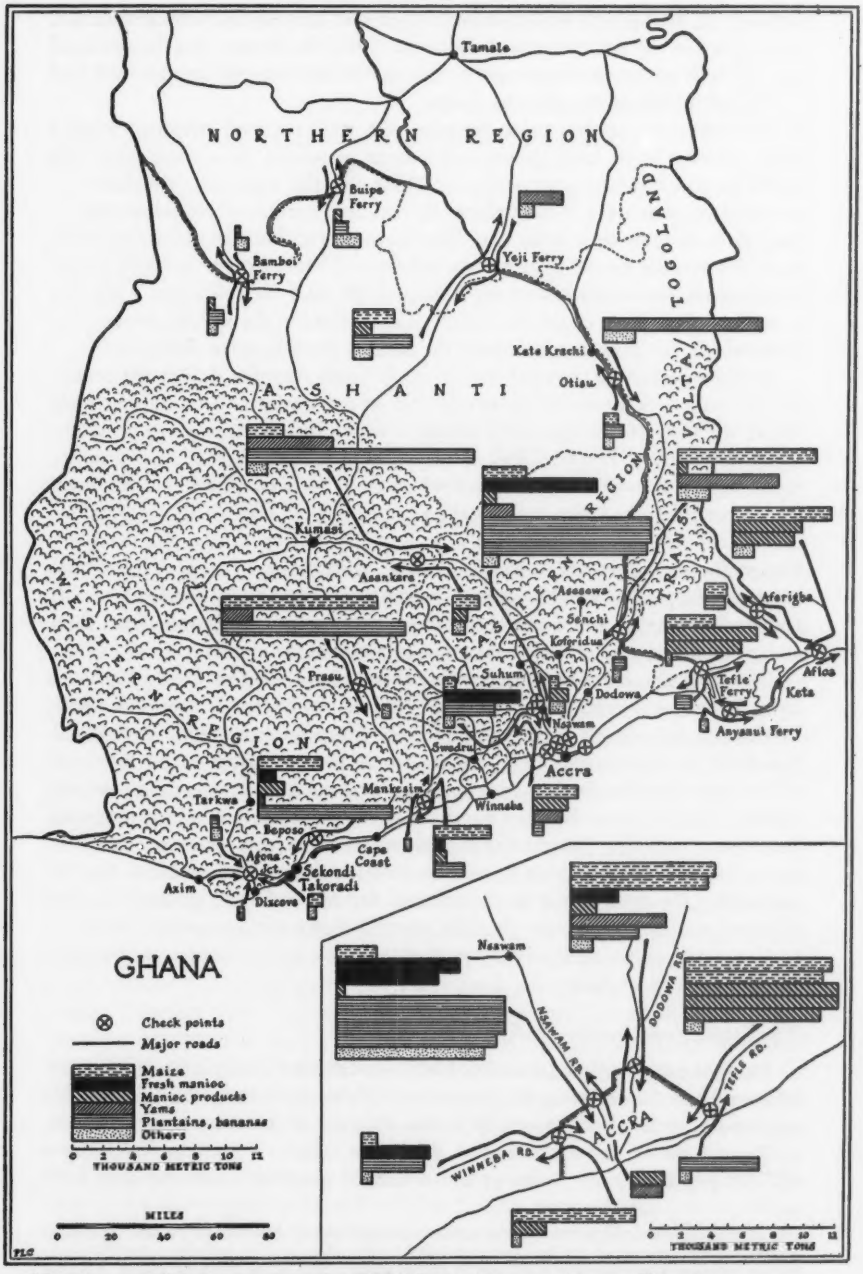
The data obtained, however, proved none too instructive: those from the ferry crossings mirrored only a tiny fraction of the total volume of foodstuffs moving toward the cities; those from the temporary surveys related to periods of not more than two-weeks duration. This situation the Government Statistician set out to rectify when, at the outset of the 1956/57 fiscal year, his Office was assigned exclusive responsibility for assembling statistics on produce flows. Beginning on October 1, 1957 the number of checking stations was greatly increased, and continuing through September 30, 1958 rather more information was collected at each than had been ever before.

Like the various short-term surveys which preceded it, the 1957/58 census was basically a record of the quantity of foodstuffs carried by truck.[24] In all, 20 check points were involved, a majority of them centered around Accra in the southeastern corner of the country (Map 2). Recording was done day and night, and at most of the stations all produce carriers were stopped. Traffic was so heavy at seven of the check points, however, that only sampling was feasible; at the six stations on the outskirts of Accra and Nsawam every tenth truck was halted, as was every third one passing the Asankare station. Each truck stopped was

[23] The findings of some of these short-term surveys are discussed in *45* and *32*.

[24] Rail movements were ignored because of their trivial quantity. During the 1953/54 fiscal year, rail shipments of specified livestock and food items (ex-cocoa) amounted to only 3,077 long tons (*22*, p. 55).

MAP 2.—GHANA, PRODUCE MOVEMENT CENSUS, 1957/58: ANNUAL FLOW OF STAPLE FOODS PASSING THE SEVERAL CHECK POINTS*



* Based on unpublished returns from the 1957/58 Produce Movement Census. Where data reported other than by weight, tonnages were estimated using the following conversion factors: maize—bag: 220 lbs.; rice—bag: 240 lbs.; millets—bag: 204 lbs.; sorghum—bag: 200 lbs.; manioc products—bag: 150 lbs.; manioc roots—bag: 200 lbs.; cocoyams—bag: 150 lbs.; and yams—tuber: 7 lbs. Factors from Ghana, Off. Govt. Stat., "Distribution Statistics—Produce Movements. . . . Conversion Factors" (n.d., mimeo.).

Movements of less than 400 metric tons not shown.

subjected to a thorough examination: origin and destination were ascertained, as was the size and composition of the cargo. This information was then entered into specially prepared forms, and at the end of each month summarized and forwarded to the central office in Accra.

Unfortunately, at this point an otherwise well executed program bogged down. Owing to an acute shortage of trained personnel, the central office was unable to give the incoming returns anything like the attention they deserved; unappraised, they were merely placed in files, and even now official analysis is thought to be some time away (*5*). The Government Statistician has, however, made the returns available to private scholars. Thanks to the courtesy of the Government Statistician and of my colleague, Mr. Marvin P. Miracle, I am able to set forth here some of the findings.[25] These relate to the starchy staples—the foods which, we have seen, comprise the basis of the Ghanaian diet.

Map 2 summarizes the total flow of staple foods recorded during the census. The over-all view it provides is revealing in several respects. Strikingly brought out, in the first place, is the trivial extent to which the consuming centers of the south draw on the northern half of the country for their staple food supplies. Apart from yams—the movements of which from the Kete Krachi area to Accra were recorded at the Otisu station—the region exported nothing of consequence. Indeed, the data for the Bamboi, Buipe, and Yeji ferries indicate the Northern Region was actually a net importer of staples during the year. This is unusual, however (*16*, p. 23). The 1958 season was an uncommonly dry one in the north, and during August and September the government was obliged to send there several thousand tons of maize and manioc products.

The map also clearly points up the urban areas on which the census sheds light. It will be seen that there were no check points in the vicinity of Kumasi; for this city, accordingly, little can be inferred. Much the same applies to Sekondi-Takoradi: the two stations in its environs were located rather too far (about 20 miles) from the urbanized area to record the total volume of movements destined thereto. For Accra, on the other hand, the check points were admirably situated. Four main roads link Accra to its hinterland, and on each of these a station was set up near the point where it crossed the municipal boundary. As food production within the city limits is inconsequential and may safely be ignored, the data collected at these four points, plus that assembled at outlying stations, permit us to construct a rather detailed outline of the origins and quantities of the staple foods consumed in Accra.

The Staple Food Supply of Accra

In all, the data indicate, a total of 144,000 metric tons of staple foodstuffs were imported into Accra during the census year. This total is altogether a reasonable one, and as such reflects favorably on the accuracy of the census. It represents, as Table 8 shows, the equivalent of 282 billion calories a year, or, assuming a 1957/58 population for Accra of about 370,000 persons, something like 2,088

[25] Because of the unique value of the census, the Food Research Institute has prepared a 20-page mimeographed summary of the basic statistics copied by Mr. Miracle. This includes a monthly, commodity-by-commodity statement of all starchy staples passing each of the 20 check points. Requests for copies should be addressed to the Institute.

TABLE 8.—GHANA, PRODUCE MOVEMENT CENSUS, 1957/58: NET ANNUAL INFLOW OF PRINCIPAL STAPLE FOODS INTO ACCRA*

Foodstuff	Net Annual Inflow (*Thousand metric tons*)	(*Billion calories*)
Plantains	41.6	31.2
Maize[a]	32.5	115.7
Manioc products	26.8	90.8
Fresh manioc	22.0	24.0
Bananas	5.5	3.7
Yams	4.5	4.0
Cocoyams	2.2	1.9
Rice	.6	2.0
Others[b]	8.3	8.7
Total	144.0	282.0

* Based on unpublished returns from the 1957/58 Produce Movement Census; caloric values calculated using conversion factors given in FAO, *Food Composition Tables—Minerals and Vitamins—For International Use* (Nutr. Studies 11, Rome, 1954), pp. 10–12, 18.

[a] Includes small amounts of sorghum.

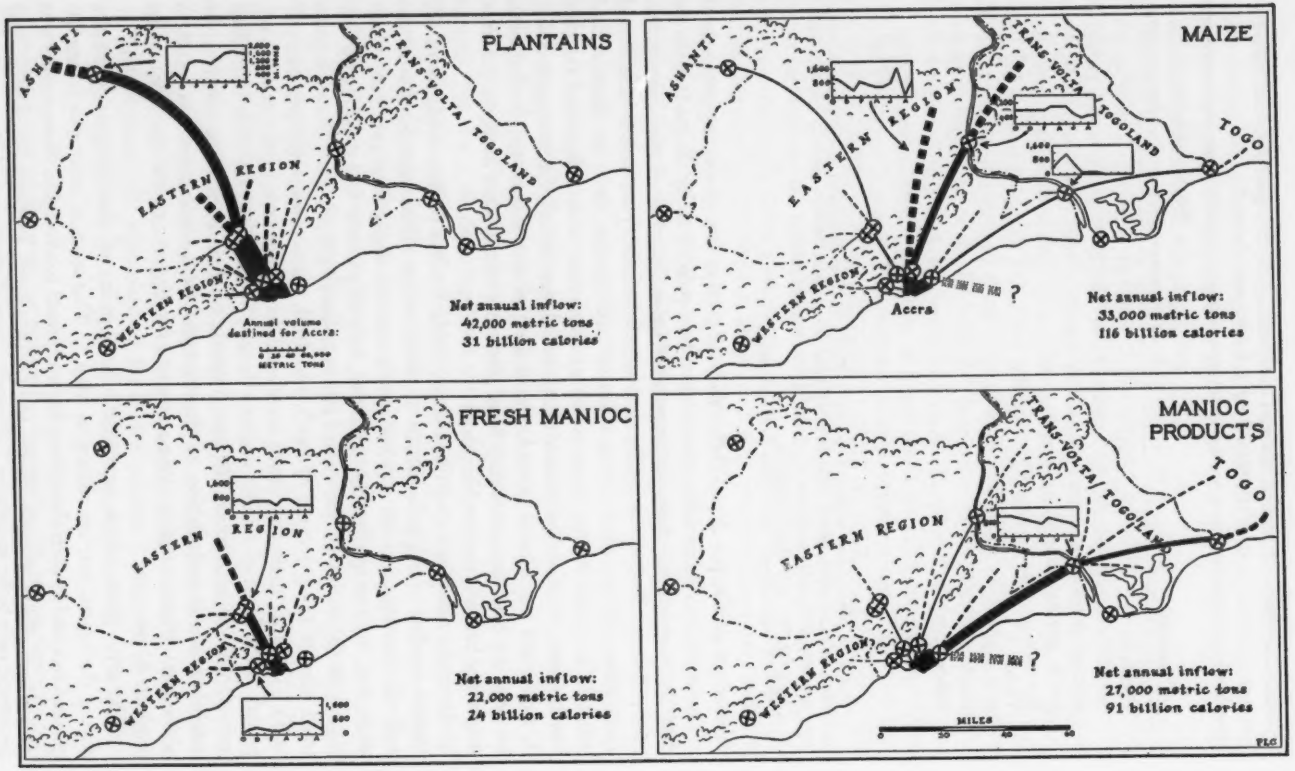
[b] Millets, "other cereals," and "other roots and tubers."

calories per person per day. While this last figure at first glance suggests a level of consumption considerably greater than that pointed to by the budget survey data for Kumasi and Sekondi-Takoradi (Table 5), most of the difference is surely illusory. Budget surveys by their nature invariably understate actual food availability and, as noted earlier, it is not unlikely that those for Kumasi and Sekondi-Takoradi did so by as much as from two to four hundred calories. Furthermore, it cannot be assumed that the full amount of the tonnage arriving in Accra was actually consumed. Some loss inevitably occurred, and though we have no basis for estimating how great this might have been, 10 per cent might not be an unreasonable guess.

As to the composition of this inflow, Table 8 offers further evidence of the limited number of staple foodstuffs on which urban Ghanaians depend for the bulk of their calories. Of the 395 metric tons of staple food products which arrived on the average in Accra each day, fully 85 per cent was made up of only four items: plantains (29 per cent; 114 tons), maize (22 per cent; 89 tons), processed manioc (19 per cent; 74 tons), and fresh manioc roots (15 per cent; 60 tons). Together these four items accounted for 93 per cent of the calories imported in the form of starchy staples—though by this criterion their individual importance was somewhat different. Because of their high water content, the combined caloric contribution of plantains and fresh manioc was but one-fifth of the total, whereas maize alone accounted for 41 per cent and the dry manioc products 32 per cent.

The areas from which Accra drew its supplies of these four main staples during the census year are shown in Map 3. This map, of course, is somewhat generalized, and as such should not be interpreted too literally. Since origin was recorded by administrative region rather than exact location, the dotted lines are meant only to be suggestive (although in positioning them I have made full

MAP 3.—GHANA, PRODUCE MOVEMENT CENSUS, 1957/58: DIRECTION AND ANNUAL MAGNITUDE OF INFLOW OF PRINCIPAL STAPLE FOODS INTO ACCRA*



* Based on unpublished returns from the 1957/58 Produce Movement Census.

use of available qualitative evidence). Otherwise, however, the findings of the census are faithfully portrayed. Where discrepancies occurred between check points (as happened only twice), the differences are indicated by a question mark.

Two things stand out in this map. One is the clear indication it gives of the distance over which the pull of the Accra market asserts itself. The area from which the city draws the foodstuffs extends far beyond its immediate surroundings in the Coastal Savanna. Indeed, the role this region plays is decidedly a secondary one, with the Forest and beyond supplying the bulk of Accra's requirements. About 55 per cent of the tonnage of the four main staples which arrived in the city during the census year came from places over 50 miles away, and some 30 per cent traveled 100 miles or more.

The other striking feature of Map 3 is the impression it conveys of the extent to which local specialization in commercial food cropping takes place. Apart from the Forest area to the northwest of the city, which supplies both fresh manioc and plantains, none of the regions provisioning Accra ships appreciable quantities of more than one major staple food item. Thus, while plantains and fresh manioc roots move in principally from the northwest, most of the city's maize comes from the north and northeast,[26] and the bulk of its processed manioc is imported from Togo to the east. That processed manioc should be brought in from Togo rather than from the same region as fresh roots warrants a word of explanation. The dry manioc products have achieved widespread acceptance among Ghanaians only within the past two or three decades. In Togo (and Dahomey), on the other hand, they have long been important staples; there, gari and kokonte processing has developed into a major industry, whereas in Ghana it is still in its infancy, with the quality of the output often decidedly inferior (*28*, pp. 77–80).

Togo also supplies maize to the Accra market; just how much, unfortunately, it is not possible to say. On this point, as the map shows, the evidence provided by the census seems conflicting. Specifically, the Tefle Road check point recorded far more maize arriving in the city from Togo than was noted at either the Tefle ferry or Afloa, the other two stations on the main road to Togo. This may or may not be valid; arguments can be offered both pro and con. The frontier between Ghana and Togo is long and poorly policed, and though the road through Afloa offers the quickest route to Accra, it is not unlikely that other routes are employed near the border to avoid payment of duties. Then too, shipment by water is not out of the question. On the other hand, however, the accuracy of the tally at Tefle Road cannot be considered above suspicion—if only because it was the sole check point that yielded data which cannot readily be reconciled with those of the others. As at the other three stations on the outskirts of Accra, checking at Tefle Road was on a sample basis, with one-tenth of the passing traffic having been stopped. The checkers were instructed to stop not any one of ten vehicles, but every tenth one. Conceivably, this order was improperly executed and a biased sample obtained. Much of the traffic from Togo reaches Accra late in the day when other traffic is light. Perhaps the checkers found it con-

[26] In line with the Department of Agriculture's belief (*12*, p. 90), I have indicated the Asesewa area as the chief source of maize in the Eastern Region.

venient to stop many trucks at that time to make up for omissions during the busier hours. This possibility notwithstanding, however, the price data for maize shown in Chart 7 suggest that the Tefle Road data are essentially correct. It will be seen that maize prices in Accra were at a minimum during the October–January period, the same months when most of the maize was recorded at Tefle Road. Were the bulk of this inflow from Togo illusory, it would be difficult to account for any decline in price; the opposite should have obtained.

The procedure followed in this study in computing aggregate inflow estimates for Accra has been to accept the questioned Tefle Road figures for both maize and processed manioc as they stand. Until official analysis of the full findings of the census is undertaken, we have no firm grounds for doing otherwise. It should be noted, however, that should the official appraisal reveal the Tefle Road figures to be in error by the amounts indicated in the map, it would have the effect of reducing the inflow totals given in Table 8 rather drastically—by about 70 billion calories, or something like 500 calories per person per day.

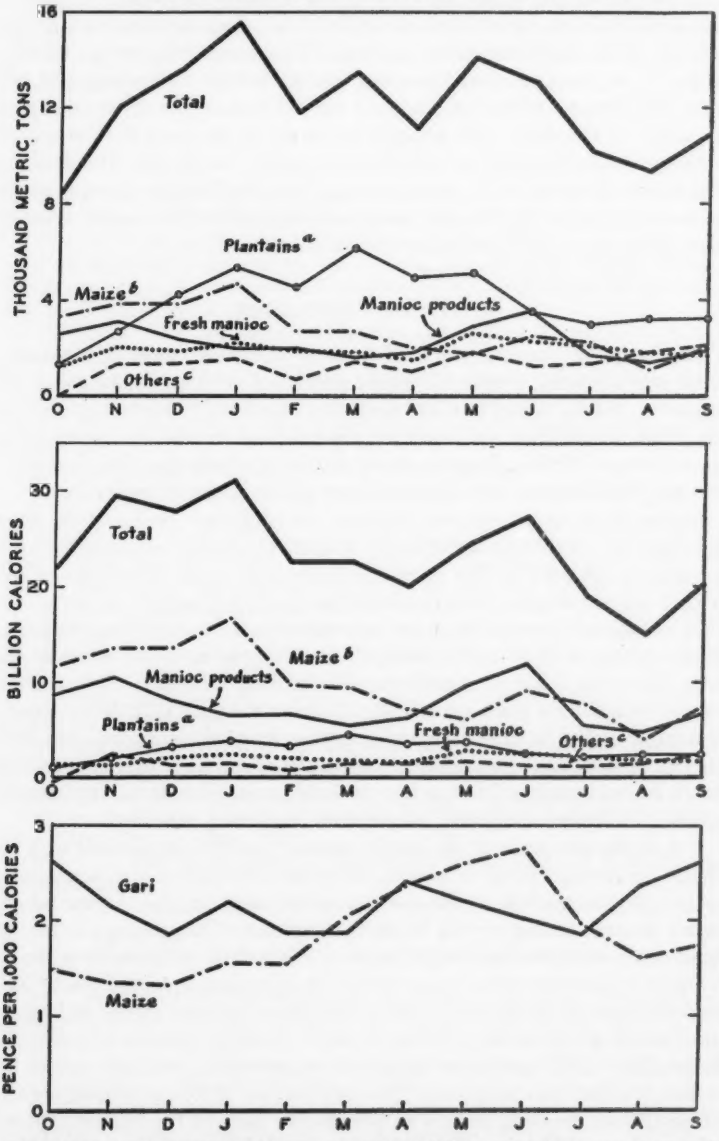
The various commodity flows illustrated in Map 3 are, of course, totals for the census year. As would be expected in view of the seasonal character of much of Ghana's agriculture, the individual magnitude of these flows varied from one time of the year to another. This is borne out both by the small charts within the map and by Chart 7, which summarizes on a monthly basis the net arrivals of the several staples in Accra.

Chart 7 is particularly worthy of examination: it contains the only direct evidence we have of the extent and nature of the seasonal changes which occur in the diets of urban Ghanaians. These, it suggests, are quite sizable. Arrivals of both maize and processed manioc, the two main suppliers of calories in Accra, varied greatly over the year, as did those of plantains, the third-ranking source. Plantains may be harvested virtually all year, the explanation for the variation in shipments probably lies in alternative uses for trucks. Most of the plantains consumed in Accra come from Ashanti and the forested area lying between that region and the city. These two areas also account for the bulk of the country's cocoa production. The main season during which cocoa is harvested and shipped to the coast extends from September through early January. It is during these months that plantain shipments to Accra were at a minimum.

The apparent variations in maize and processed manioc consumption almost surely reflect a combination of seasonal supply conditions and consumer preferences. Maize is harvested in southern Ghana and Togo during two periods of the year: midsummer, when the early crop of the forested regions matures; and October–January, when both the second crop from these areas and the only crop of the Coastal Savanna are collected. The result is that maize is in decidedly seasonal supply in the Accra market. Prices respond accordingly (Chart 7, bottom section). During the census year the price of maize was comparatively low between August and January, while it rose sharply during the spring and early summer months.

The effect of these price fluctuations on processed-manioc consumption seems clear. Though manioc is available for harvesting throughout the year, arrivals of the processed products in Accra were markedly seasonal. As the price of maize rose in the spring (to the point where it became rather more expensive

CHART 7.—GHANA, PRODUCE MOVEMENT CENSUS, 1957/58: NET MONTHLY INFLOW OF STAPLE FOODS INTO ACCRA; AND AVERAGE MONTHLY WHOLESALE PRICE OF MAIZE AND GARI IN THE ACCRA MARKET*



* Net inflows based on unpublished returns from the 1957/58 Produce Movement Census; price data from Ghana, Dept. Agr., *Monthly Report—Foodstuffs Supply Position* (various issues); caloric values calculated using conversion factors given in FAO, *Food Composition Tables—Minerals and Vitamins—For International Use* (Nutr. Studies 11, 1954), pp. 10–12, 18.

[a] Includes bananas.

[b] Includes sorghum.

[c] Rice, millets, yams, cocoyams, "other cereals," and "other roots and tubers."

in terms of calories than gari), imports of the dry manioc products increased greatly—to the extent, even, that they appear to have temporarily supplanted maize as the chief source of calories—only to drop off again a few months later when the relative price of maize declined. This complementary price-inflow relationship between maize and processed manioc is highly revealing. Not only does it offer further evidence of the less preferred position the dry manioc products occupy in the diet, it also strongly attests to the efficiency with which the marketing system responds to local price and supply conditions. The flexibility of the system seems such that urban consumers may confidently expect to receive adequate supplies of the cheapest energy sources available, no matter what the season of the year and no matter what their place of origin.

CONCLUDING OBSERVATIONS

The foregoing picture of the food economy of Ghana's cities is, of course, a partial and introductory one. Given the paucity of evidence on economic phenomena in Middle Africa, it could hardly be otherwise. Nonetheless, examination of the limited data now available has provided us with certain useful insights. Several of these, because of the extent to which they run contrary to previously held notions, seem important enough to justify reemphasis.

Among these, to be sure, are the broad conclusions which may be drawn regarding the functioning of the supply system. Despite its technological primitiveness, the efficiency of this system seems beyond doubt. Far from limiting Ghana's urban centers to hinterlands within a radius of twenty or thirty miles, it has, in conjunction with the recent improvement in the road network, enabled them regularly to draw staple foodstuffs from supply areas 100 miles or more away. Moreover, it has permitted producers in these areas to specialize in those crops for which their lands are best suited, and at the same time demonstrated a remarkable agility in responding to changing seasonal conditions. Manifestly it is a thing of value, as are the incentives which make it possible; cautious indeed should be any attempts (such as appear to be contemplated) to supplement or replace it with state controlled "cooperative" marketing ventures.

But if the operation of the supply system provides ample indication that Ghanaians are capable of responding efficiently and rationally to economic incentives, it does not follow that one can safely anticipate their future behavior merely through analogies with Western experience. This, perhaps, is the most significant revelation of the budget surveys. Particularly with respect to the type of dietary adjustments which accompany rises in income, a point of crucial future importance, we have observed a sharp divergence between reality and expectation: instead of incorporating greater amounts of animal proteins into their diets, the wealthier urban consumers apparently eat essentially the same type of meal as their less fortunate neighbors. The implications of this, of course, are all to the good from the point of view of production. Because the starchy staples are much easier and cheaper to produce than animal products, a continuation of present dietary patterns will lessen the demands on agriculture posed by urbanization. But why this rigidity should obtain remains obscure. Conceivably a whole new dietary must evolve (comparable to that which occurred a generation

or so ago in the United States when the salad course achieved widespread acceptance) before any appreciable changes in its composition can take place. But whatever the explanation, the pitfalls of blind extrapolation are obvious. Middle Africa is a world of its own. Essential to the accommodation of the problems of its future growth is an understanding of its present.

CITATIONS

1 Ioné Acquah, *Accra Survey* (London, 1958).

2 P. T. Bauer, *West African Trade* (Cambridge, 1954).

3 M. K. Bennett, *The World's Food* (New York, 1954).

4 W. B. Birmingham and G. Jahoda, "An African Public Opinion Survey," in *Proceedings of the Fourth Annual Conference of the West African Institute of Social and Economic Research* (Ibadan, 1956).

5 W. L. Booker, Government Statistician, Accra, Ghana, letter to M. P. Miracle, dated Aug. 5, 1960.

6 Friedrich Burgdörfer, ed., *World Atlas of Population—Distribution of the Population on the Earth about the Year 1950* (Hamburg, 1954).

7 K. A. Busia, *Report on a Social Survey of Sekondi-Takoradi, Gold Coast 1947–48* (London, 1950).

8 A. W. Cardinall, *The Gold Coast, 1931* (Accra, n.d.).

9 M. Crossley, "Some Puzzling Spending Habits in Ghana: A Comment," *Econ. Bull.* (Accra), Mar. 15, 1958.

10 M. Fortes, R. W. Steel, and P. Ady, "Ashanti Survey: 1945–46: An Experiment in Social Research," *Geog. J.* (Roy. Geog. Soc., London), Oct.–Dec. 1947.

11 Ghana, Dept. Agr., *Annual Report . . . for the Year 1955–56* (1958).

12 ———, "Miscellaneous Information 1958/59 Estimates" (mimeo, n.d.).

13 Ghana, Off. Govt. Stat., *Quarterly Digest of Statistics,* June 1960.

14 Benjamin Gil and K. T. De Graft Johnson, "The Post-Enumeration Survey in Ghana," *Econ. Bull.* (Accra), April 1960.

15 Gold Coast, Dept. Agr., *Annual Report . . . 1949–50* (1951).

16 Ibid., 1953–54 (1956).

17 Gold Coast, Depts. Med. and Ed., *Gold Coast Nutrition and Cookery* (1953).

18 Gold Coast, Off. Govt. Stat., *Census of Population, 1948, Report and Tables* (1950).

19 ———, *Kumasi Survey of Population and Household Budgets, 1955* (Stat. and Econ. Papers No. 5), March 1956.

20 ———, *1953 Accra Survey of Household Budgets* (Stat. and Econ. Papers No. 2), December 1953.

21 ———, *Sekondi-Takoradi Survey of Population and Household Budgets, 1955* (Stat. and Econ. Papers No. 4), March 1956.

22 Gold Coast, Railway and Harbour Authority, *Administration Report . . . 1953–54* (1954).

23 L. M. Goreux, *Income Elasticity of the Demand for Food—Household Survey Analysis* (UN, Econ. Commis. Europe, Com. on Agr. Prob., AGRI/WP.7/2, 22 June 1959).

24 Faye W. Grant, "Nutrition and Health of Gold Coast Children," *J. Am. Diet. Assn.,* July 1955.

25 Polly Hill, "Some Puzzling Spending Habits in Ghana," *Econ. Bull.* (Accra), June 1957, Pt. 1; November 1957, Pt. 2; and December 1957, Pt. 3.

26 B. F. Johnston, *The Outlook for Wheat and Flour Imports in Tropical Africa* (U.S. Dept. Agr., For. Agr. Serv., February 1959).

27 ———, *The Staple Food Economies of Western Tropical Africa* (Stanford, Calif., 1958).

28 W. O. Jones, *Manioc in Africa* (Stanford, Calif., 1959).

29 S. LaAnyane, "Aweso—A Manya Krobo Huza" (Ghana, Dept. Agr., mimeo., January 1958).

30 C. W. Lynn, *Agriculture in North Mamprusi* (Gold Coast, Dept. Agr. Bull. 34, 1937).

31 Lucius Nicholls, *Tropical Nutrition and Dietetics* (3d ed., London, 1951).

32 B. M. Niculescu, "Preliminary Report to the National Food Board on Food Supplies to Sekondi-Takoradi" (Econ. Res. Div., Univ. Coll. of the Gold Coast, mimeo., July 13, 1955); and "Second Report . . . " (Dec. 15, 1955).

33 K. A. J. Nyarko, "The Development of Kumasi," *Bull. of the Ghana Geog. Assn.* (Legon), January 1959.

34 Astrid Nypan, "Market Trade in Accra," *Econ. Bull.* (Accra), March 1960.

35 E. J. Pedler, *Economic Geography of West Africa* (London, 1955).

36 E. R. Rado, "A Social and Economic Survey of Bentsir Quarters, Cape Coast," in *Proceedings of the Third Annual Conference* [1954] *of the West African Institute of Social and Economic Research* (Ibadan, mimeo., 1956).

37 Royal Institute of International Affairs, *Ghana: A Brief Political and Economic Survey* (London, May 1957).

38 Dudley Seers and C. R. Ross, *Report on Financial and Physical Problems of Development in the Gold Coast* (Gold Coast, Off. Govt. Stat., 1952).

39 H. H. Smythe and Mabel M. Smythe, *The New Nigerian Elite* (Stanford, Calif., 1960).

40 A. C. Sutherland, "Private Enterprise Housing in the Urban Area of Kumasi," in *Proceedings of the Fourth Annual Conference* [1955] *of the West African Institute of Social and Economic Research* (Ibadan, mimeo., 1956).

41 Uganda, E. Afr. Stat. Dept., *The Patterns of Income, Expenditure and Consumption of African Unskilled Workers in Mbale, February, 1958* (1958).

42 United Nations (UN), Dept. Econ. and Soc. Aff., *Economic Survey of Africa Since 1950* (1959).

43 W. J. Varley and H. P. White, *The Geography of Ghana* (London, 1958).

44 H. P. White, "Environment and Land Use in the South Eastern Savannas of the Gold Coast," in W. Afr. Inst. of Soc. and Econ. Res., [Fifth] *Annual Conference Proceedings, March 1956* (Ibadan, mimeo., 1956).

45 ———, "Internal Exchange of Staple Foods in the Gold Coast," *Econ. Geog.*, April 1956.

MANIOC IN AFRICA: CORRECTION

Thomas T. Poleman's intensive study of the food economies of Ghanaian cities, published in this issue of *Food Research Institute Studies,* has uncovered two errors in the construction of Table 8-4 of my *Manioc in Africa* (Stanford, Calif., 1959). This table, entitled "Ghana: Average Daily Purchases of Manioc and Other Starchy Staples in Five Communities, 1954-56," is based in part on the same sources as Mr. Poleman's Table 5 and Table 7. My figures for Kumasi and Sekondi-Takoradi were based on summary tables in the original sources which failed to include some foodstuffs purchased in small amounts—krako, manioc dough, shelled corn (maize), prepared plantain, and prepared rice in both cities and gari in Sekondi-Takoradi. Inclusion of these products increases the total calories derived from starchy staples from 1,318 to 1,364 in Kumasi and from 1,104 to 1,260 in Sekondi-Takoradi. Calories from manioc as a per cent of all calories from starchy staples, however, are unchanged.

The data shown for South-East Akim Abuakwa in my table are also in error, apparently because they were calculated with an American short ton rather than the English long ton. The correct figures are given in Mr. Poleman's Table 7 and in my Table 8-5. They show manioc to account for 50 per cent of all calories from starchy staples instead of 46 per cent as shown in my Table 8-4.

W. O. J.

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